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SUMMER 2012 • VOL. XXXIII, NO. 3

PW PRACTICAL Winery & Vineyard JOURNAL

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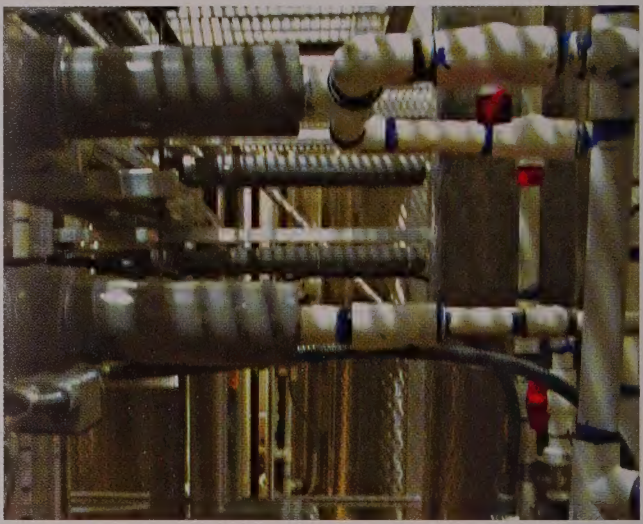

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EDITORIAL
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58-D Paul Drive,
San Rafael, CA 94903
415/479-5819
www.practicalwinery.com

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PRACTICAL WINERY & VINEYARD JOURNAL (ISSN 9739-8077) is owned and published by Wine Communications Group. Published quarterly at subscription rate of $35/year domestic, Canada $45/year, and all other countries $55/year. Postmaster: send change of address to Practical Winery & Vineyard: P.O. Box 3629, San Rafael, CA 94912-9830. Back issues: $10 prepaid. Periodicals postage paid in San Rafael, CA and additional mailing offices. News media may use no more than 1/4 page of material per issue provided that PRACTICAL WINERY & VINEYARD JOURNAL is credited.

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Cover Photo:
Russell Ranch Vineyard
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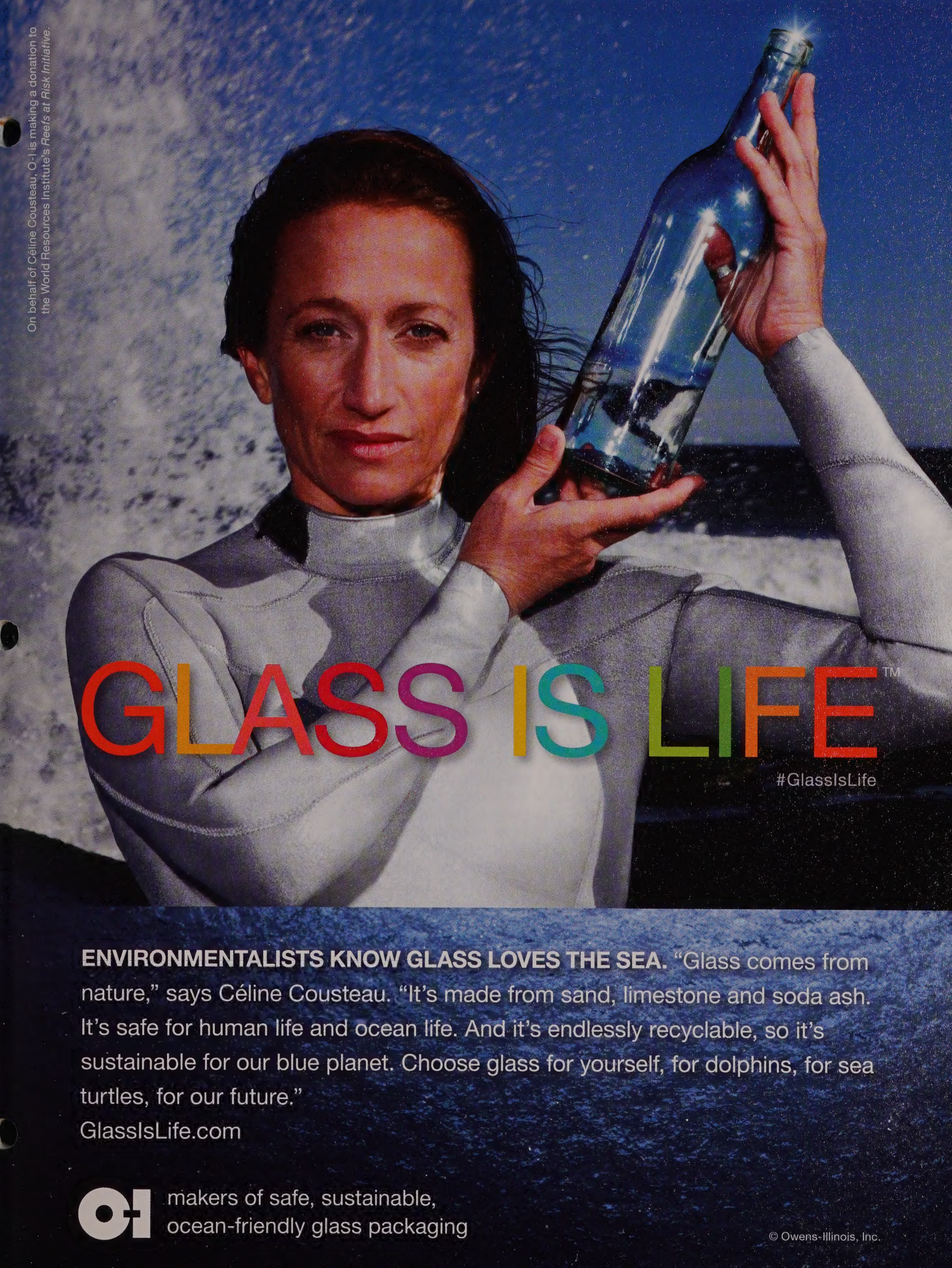

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CLEAN GRAPEVINE MATERIAL

Russell Ranch Foundation Vineyard is underway

BY **Michael Cunningham, Production Manager**
Foundation Plant Services, UC Davis

AN important decision reached by the National Grape Clean Plant Network (NCPN) in February, 2009, was to set the future national standard for grapevine foundation material in the U.S. at a rigorous new level. Compliance with the new NCPN standard will ultimately be required as a prerequisite to NCPN certification for foundation vineyard collections.

The NCPN, established by the Farm Bill of 2008, applies funding of $20 million over four years for specialty crops, to provide healthy sources of propagation material, free of plant pathogens that can affect quality of the crop.

To meet the new NCPN standard, Foundation Plant Services (FPS), has begun to establish a new foundation vineyard on a portion of a 1,600-acre parcel of Russell Ranch, about four miles west of the UC Davis campus. In 1990, UC Davis acquired Russell Ranch to serve large-scale agricultural and environmental research, the study of sustainable agricultural practices, and other land-based programs.

FPS has been assigned a total of 100 acres at Russell Ranch, which should accommodate FPS needs for 5 to 7 years.

NCPN funds were used by FPS to develop a new well and pump for irrigation, and purchase a tractor and implements for exclusive use at the Russell Ranch location. Further proposals earmark funds for fumigation, fencing, trellis installation, and above-ground irrigation lines.

A new well has been completed with a bore approximately 340 feet deep. The water quality and quantity is good. The well pump has been installed, electrical hook-ups made, and a cement pad to accommodate various panels and filters was poured. A 3,000-gallon steel pressure tank, required to ameliorate the high water pressure coming from the well before it enters the underground irrigation lines, was installed in October 2011.

In October 2010, 20 acres of land was plowed, deep chiseled 36 inches deep, disked, and prepared for fumigation (a 98% methyl bromide, 2% chloropicrin concentrate) to control fungal pathogens, eliminate nematode populations, and to kill most weed seeds.

In order to revitalize the soil after the virtual sterilization with methyl bromide, oat seed was sowed onto the fumigated land, and the grain grew through the winter before being chopped and disked into the ground, providing organic matter to enhance soil fertility.

The first ten acres of trellis necessary for proper growth, training, and sun exposure of the fruiting grape varieties, has been installed. The custom made lyre-type system is needed at Russell Ranch to take advantage of the vigorous growth expected from the vines, and to maximize the quality and quantity of propagation material that will be harvested and distributed.

Individual vines in the existing Foundation Vineyards that meet the virus testing standards of the 2010 Protocol, have been identified for repropagation to the Russell Ranch site. These are the highest level of clean plant material available in the world at this time.

All selections planted in the Russell Ranch Vineyard are produced using microshoot tip tissue culture therapy. This will provide planting stock free of unknown cryptic viruses, and those viruses for which tests have been developed. By default, this material should also be free of the bacteria that cause crown gall disease.

First planting in 2011

Micro-shoot tip culture needed to qualify vines for Russell Ranch

Shoot tip culture is a disease elimination technique in which pieces of the apical growing point are excised from a plant and cultured in a sterile growth media apart from the plant.

In micro-shoot tip therapy, as practiced at FPS, a growing tip that is less than 0.5mm is excised from the shoot tip. Many pathogens, including viruses and the crown gall bacterium, are eliminated by this technique. A micro-shoot tip includes the meristematic dome and two to four leaf primordia. A meristematic dome is a rounded group of undifferentiated cells that divide and have the capability to become leaves, flowers and other structures.

Leaf primordia are very small, immature leaves. A micro-shoot tip is just barely visible to the naked eye. To excise such small pieces we use a binocular dissecting scope with 10–80X zoom magnification. The shoot tips are cleaned and surface sterilized to prepare for aseptic excision under a transfer hood. The young growing tip is removed and placed into a test tube with sterile tissue culture growth medium, where the new plant develops.

Incubation in a growth chamber under controlled conditions until roots and shoots have developed is essential. This phase continues until the explant produces a shoot and roots and is about 10 cm long. This takes 6 to 18 months. The combination of low hormone levels with a minimum time in culture reduces the chance of mutation and regeneration of an off-type plant. For grapes, the success rate of micro-shoot tip culture for eliminating viruses is far higher than for any other known type of therapy.

In macro-shoot tip therapy, more commonly practiced and less expensive, a growing tip that is about 5 to 10 mm in length is cut from the shoot tip. A macro-shoot tip includes a micro-shoot tip, small, scaly leaves, and a short section of stem. This piece is 10 to 20 times larger than the piece cut for micro-shoot tip culture. It is surface sterilized and stuck in nutrient medium until it produces a shoot and roots and is about 10 cm long. This takes about three months.

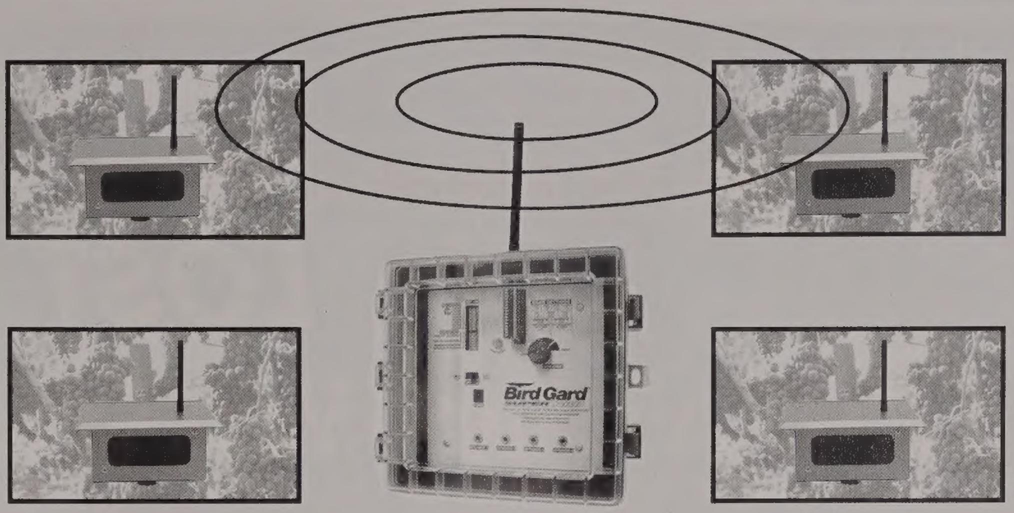
Macro-shoot tip culture reliably eliminates the Agrobacterium vitis bacterium, which causes grape crown gall disease. It does not reliably eliminate virus infections.

2011 Plantings

The first Russell Ranch Foundation Vineyard grapevines went from containers to the field in 2011. 260 grape rootstock vines (five to 12 plants from 19 rootstock selections) were planted at 24′ x 24′ spacing on July 8, 2011. On July 14, approximately 350 scion grapevines (two to ten vines per scion) were planted in the trellised portion of the vineyard.

Initial distribution of propagation materials sourced from this vineyard will be limited to mist-propagated, own-rooted vines generated from green shoots taken from the young vines. Graft-able size wood will not be available for several years, as the FPS field crew uses the new growth to establish and train the new vineyard to a trellis system designed to encourage production of optimal quality vegetative growth.

Additional grape plants are being produced by FPS laboratory and greenhouse personnel, and in summer 2012, several hundred additional vines will be planted. ■



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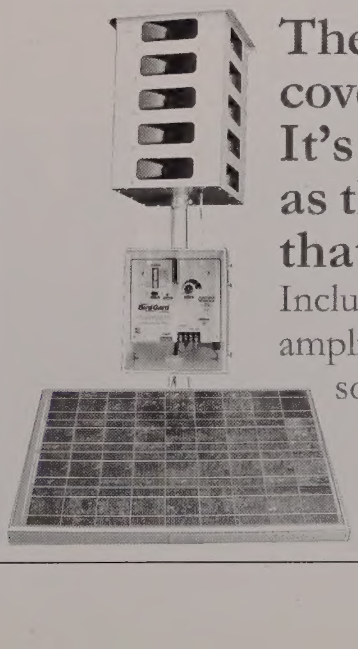

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USE OF SULFUR FUNGICIDE RESIDUE

TRACKING *LOST* IRRIGATION WATER

BY **Eve-Lyn S. Hinckley,**
Institute of Arctic and Alpine Research

During the months that Northern California grapevines are growing (April through September), very little rain falls. Only during the vines' dormant months (October through March) does most of the rainfall occur. Thus there is a cyclical disconnect between the supply of and demand for water resources necessary to sustain vines.

Unless they have reliably producing wells, growers must capture and store rainfall or divert stream flow into surface reservoirs each year, and then hope that they have enough water stored to make it to harvest. In years of low rainfall or particularly high temperatures during the growing season, winegrowers can be vulnerable to water shortages or crop losses.

Since this vulnerability may increase as climate change affects temperature and precipitation,[1,2] understanding how much water is lost per irrigation event and exploring how current irrigation methods can be modified to maximize efficiency and minimize losses are critical to a successful managed harvest.

For example, in the November/December 2008 PWV, winemaker Jennifer Williams of Spottswoode Estate Vineyard (St. Helena, CA) discussed the reality of water limitation, and stated that she and others were pushing toward more innovative, sustainable irrigation practices.[3] The need to understand water limitation and inform alternative approaches led to the research question addressed in this study: What path does irrigation water take through soils, and how much water is lost below the rooting zone?

To address the question, elemental sulfur applied as a fungicide was used as a tracer to quantify the water lost in cracks (having little or no contact with vine roots) compared to water that interacted with the soil matrix (accessible to vine roots).

Although vines are the targets for applied sulfur, broadcast spraying coats the entire vineyard, including the soil. Initial study of the fate of sulfur upon application to the vineyard revealed that it oxidizes immediately to sulfate on the soil surface.[4] This finding is consistent with several previous studies of sulfur application to agricultural systems.[5,6,7]

In vineyards, accumulated sulfate on the soil surface can be transported through the soil profile during irrigation events, and, more likely, dormant season rain storms.[8] In ecosystem science, the study of reactive elements such as sulfur can provide a "chemical label" for the water that carries them. By studying the chemical transformations of applied sulfur, it is also possible to infer the residence time of the sulfur-carrying water in the soil.

Clays, critters, cracks ... and artesian wells

At the Napa County vineyard where this study occurred, and in many other agricultural settings, the cracks on the ground surface are caused by the clay mineralogy and physical properties of the soil. Regular vineyard practices, such as weekly irrigation (causing wetting and drying of the soil) and use of salts such as magnesium chloride to decrease dust on vineyard avenues, also contribute to crack formation (Figure 1). In many cases, cracks can extend vertically for several centimeters through the soil profile, allowing for speedy passage of water, bypassing the vine roots.

Additionally, the burrowing of gophers or other small mammals can create long tunnels that serve as another pathway to rapidly transport water out of a vineyard. A study on nearby Marin County slopes found that gopher mound density is approximately 0.27 mounds ft-2 (2.88 mounds m-2).[9]

In the Carneros region, where soils are shallow (less than 2 feet, or 0.6 meters) and the depth of the rooting zone is constrained by an impenetrable clay hardpan, gophers have been observed making their way just below the soil surface, often across entire vineyard blocks. When irrigation water is short-circuited by a burrow, it is eventually seen burbling to the surface like an artesian well – strong visual evidence of

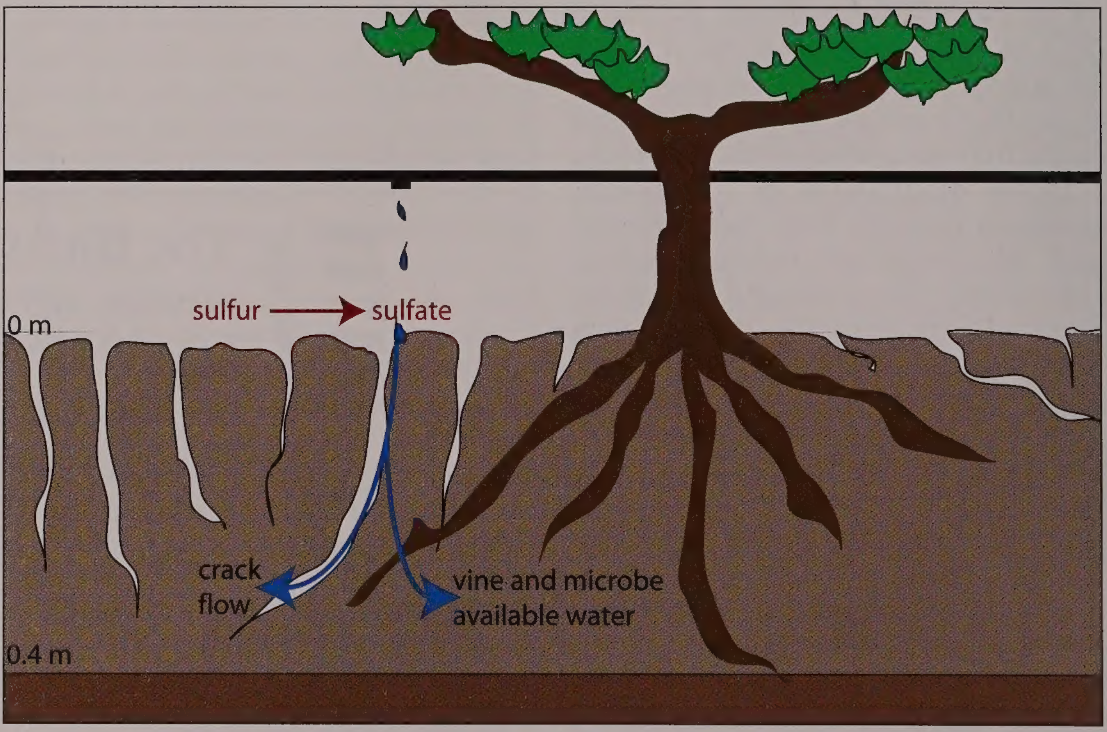

Figure 3: Diagram of hypothesized water and sulfur movement through vineyard soils.

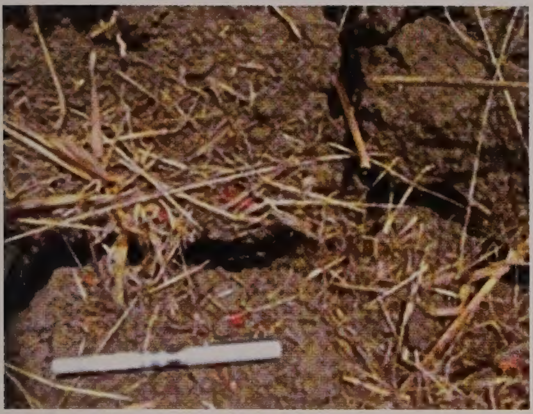

Figure 1: Cracks on the surface of a Carneros vineyard, Napa Valley (pen shows scale).

the volume that can be transported via this pathway.

Using sulfur as a tracer of water losses

In this study, the sulfur chemistry of precipitation, irrigation water, leachate (water measured below the vine rooting zone during irrigation events), and soil water (water measured below the vine rooting zone during rain storms) were tracked for three years at a vineyard site of Robert Sinskey Vineyards, located in the Carneros region of Napa County.

Measurements were made in a 3.7-acre (1.5-hectare) block planted with Dijon 114 Pinot Noir grafted onto 101-14 rootstock, aligned in rows perpendicular to the dominant slope with 6-foot (1.8-m) vine spacing. When this study began, the vines were 16 years old. Each year, the winegrowers seeded a dormant season cover crop (including *Rosa*, *Trifolium*, and *Triticale* species) to increase soil nutrients and decrease erosion.

To capture leachate and soil water below the rooting zone of the vines, instruments called lysimeters were installed throughout the vineyard block (see Figure 2). Two types of lysimeters were used: zero-tension, which act as pans that passively collect water moving vertically through the soil, and tension, which extract water from the soil matrix with the application of a vacuum. Zero-tension lysimeters captured leachate during irrigation events. Tension lysimeters collected soil water during rain storms that saturated soils.

All water samples were analyzed in the laboratory for sulfate concentration, and the isotopic composition of sulfate. The isotopic composition of an element-like sulfur refers to chemical differences at the atomic level. The isotopes of sulfur used in this study were atomic weights 32 (the most abundant) and 34.

Knowing the isotopic composition of sulfur in a soil or water sample is useful because the value changes based on the source of sulfur (sulfur in rainfall compared to applied S0 or with modification by microbes (for example, if they eat sulfate to produce hydrogen sulfide, a sulfur gas). These values are expressed using delta notation (δ) and in units of per mil, denoted by ‰. Based on studying the isotopic values of different samples, one can piece together the path sulfur took through the soil, and the water in which it was dissolved.

The hypothesis driving this research effort was that sulfate dissolved in irrigation and precipitation waters entering vineyard soils would have a different chemical and isotopic composition than

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sulfate that had been in the soil for an extended period of time, potentially getting transformed by microbes.

Changing the isotopic composition of sulfate changes the signal of the water carrying it, and provides a tracer to differentiate between new water (precipitation and irrigation water that moves rapidly through cracks) and old water (water stored in the soil matrix, available to vine roots and microbes). Figure 3 shows a diagram of this water flow hypothesis.

Major findings

Results showed dramatic differences in sulfate concentration and isotopic composition of the vineyard water inflows and outflows, enabling differentiation of major hydrologic pathways in the soil. Figure 4 shows the range of sulfate concentrations and corresponding isotopic values measured.

In general, water captured in the subsurface as leachate during irrigation had low sulfate content (4.5 mg SO_4^{2-}-S L^{-1}) and low isotopic value (7.7‰), similar to irrigation water. In contrast, soil water captured under saturated conditions was more than twice as high in sulfate concentration (13.7 mg SO_4^{2-}-S L^{-1}) and isotopic value (13.5‰). These results indicate that during irrigation events, a substantial amount of leachate resulted from irrigation water that had flowed through the cracks, and had little contact with vine roots or the soil matrix, which would have resulted in higher values.

Measurement of leachate volumes in the zero-tension lysimeters allowed us to quantify the amount of water moving through cracks during irrigation events (the amount of irrigation water lost). Figure 5 shows the volumes of water captured during 4- and 8-hour irrigation events.

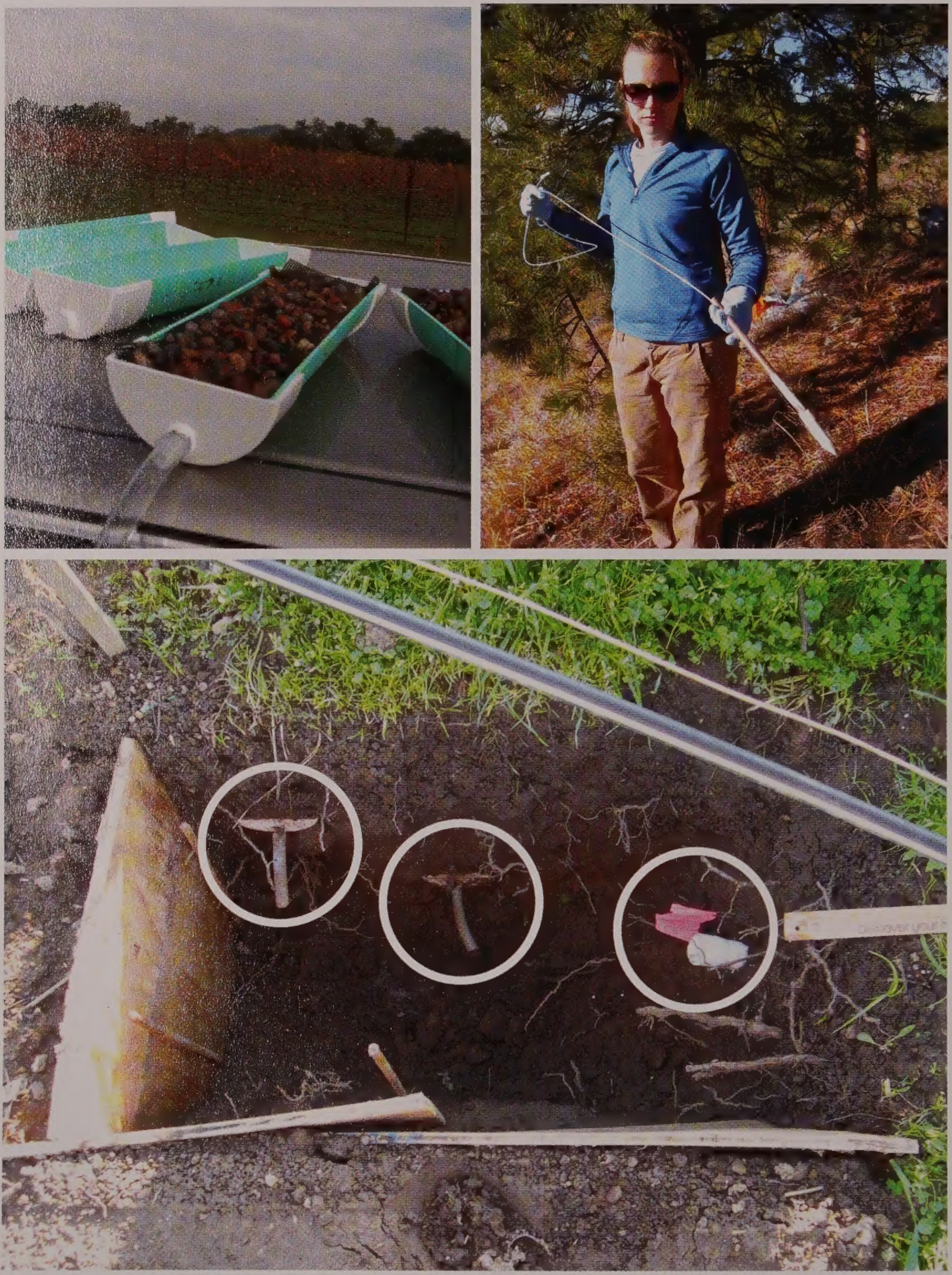
By calculating the likely volume of a wetted cone beneath a drip emitter, these measured volumes could be scaled to the total water lost. Results showed that at least 10% of irrigation water was lost below the rooting zone of the vines. Because the instrumentation used in this study was not designed to capture flow through gopher burrows, this calculation probably underestimates the flux of water off-site.

What does it all mean?

In other agricultural settings, such as California's Central Valley, a grower would want to flush at least 10% of the irrigation water below the rooting zone to remove solutes that would damage the crop. Regions like the Central Valley suffer from poor-quality irrigation water, under-irrigation (not watering enough to flush solutes from the soil), and deep accumulation of salts in the soil profile.[10]

However, in Napa County vineyards, these issues are not a relevant management concern, while conserving the most water possible is. Comparing the sulfur "signature" of the inflow and outflow waters provided evidence that water is lost in cracks during irrigation events.

The immediate capture of water in zero-tension lysimeters and subsequent measurement of volumes collected provided further confirmation of irrigation water's speedy path. This study supports exploring alternatives to standard water delivery methods (such as drip irrigation), and pursuing methods of



Photos by E.S. Hinckley

Figure 2: (A) Zero-tension lysimeters ready for installation. (B) Tension lysimeter. (C) Reinforced soil trench at Robert Sinskey Vineyards, showing two installed zeo-tension lysimeters (circled), and installation hole for tension lysimeter, marked by pink flag.

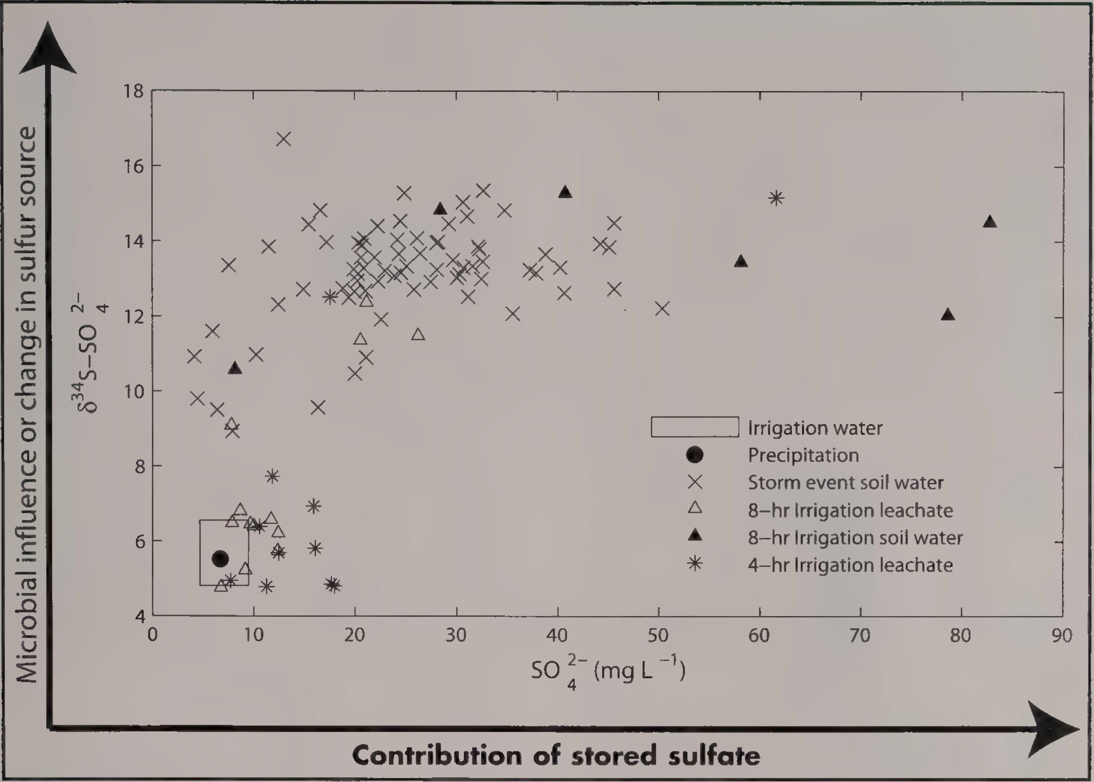
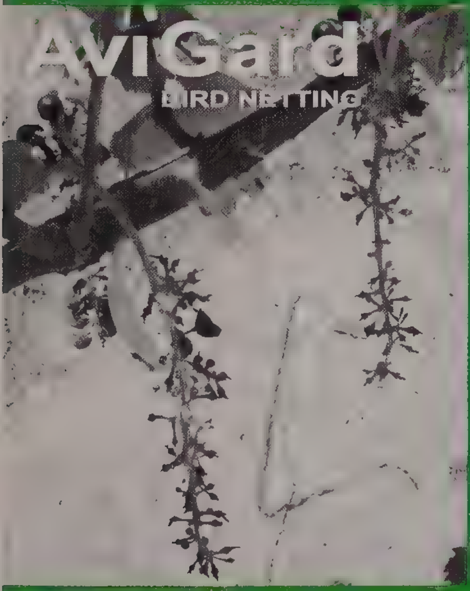


Figure 4: Sulfate concentration versus isotopic signature of different vineyard source and outflow waters.

Birds cost US growers millions of dollars annually in lost and damaged fruit.



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recapturing low-solute leachate to irrigate at a later date, thereby extending limited resources.

How can winegrowers reduce water losses?

Although alternatives to drip irrigation and treatments to reduce soil cracking were not evaluated explicitly in this study, several management approaches can help reduce water application and losses. Informal discussions with Carneros winegrowers have confirmed that many of these approaches are already in trial in vineyards with cracking soils.

One way to increase the retention of irrigation water in the soil and reduce the amount needed per event is by changing how water is delivered. For example, drip lines could be closer to the soil surface to act more like a soaker hose, or even buried, and berms could be built up near vines to improve structure and reduce the development of cracks. Instead of rapidly taking the path of least resistance through cracks, water would then saturate into soil pores where it could become available to vine roots.

Another modification to water delivery observed in a particularly water-limited hillside vineyard is running small-diameter PVC pipes from the ground surface to the rooting zone of each vine and sending irrigation water through narrow tubing directly where it is needed.

There are drawbacks to these alternative water delivery methods, however. In the first case, tangling or clogging of drip lines on the ground surface could occur, and they could interfere with floor management and cultivation practices, and in the second, placing PVC pipe next to each vine would be very labor-intensive, and potentially expensive.

Recapture and reuse of low-sol-

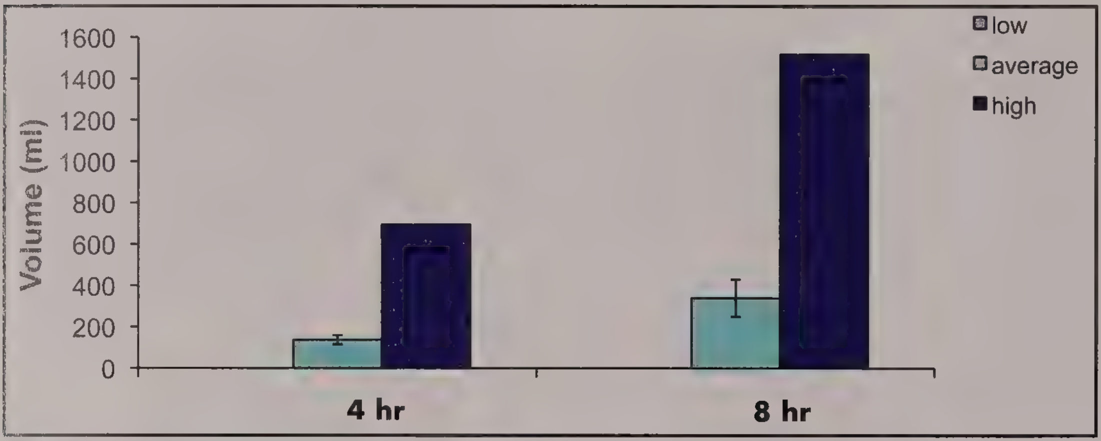

Figure 5: Volumes of leachate water measured in zero-tension lysimeters during 4 and 8 hour irrigation events.

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ute leachate losses may be an easier approach than the aforementioned alternatives. In vineyards where a drainage system such as tile drains is already in place, outflow could be recaptured for redistribution during a later irrigation event, reducing some of the immediate losses. At the vineyard used in this study, reclaiming the 10% of irrigation water used during the growing season would have provided an additional irrigation event, at 1 gal (4 L) hr^{-1} vine^{-1} for four hours.

Take home message

Applied sulfur provided a useful and novel tracer for following water through vineyard soils and separating hydrologic flow paths through cracks (losses) and the soil matrix (storage). The findings in this research point to the importance of considering water and nutrient flow through cracks and exploring alternative approaches to standard irrigation practices in areas where they are prevalent.■

Acknowledgments

This research was funded by an EPA/STAR fellowship and Geological Society of America Grant to E.S.H., and Stanford University funds to Pamela Matson. Special thanks to Debby Zygielbaum and Kirk Grace of Robert Sinskey Vineyards for hosting this research.

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Albariño – Chardonnay

MODULATING WINE STYLE WITH DAP

BY **Paul A. Henschke, Cristian Varela, Simon Schmidt, Tracey Siebert, Radka Kalouchova, Chris D. Curtin and I. Leigh Francis**
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A wine's style is largely defined by a combination of the varietal attributes contributed by the grape, with the vinous character provided by the yeast. In this context, viticultural decisions and fermentation choices enable winemakers to manage wine style, ranging, for example, from complex and savoury to fruity, and reductive to oxidative.

This article provides insights into how managing fermentation nitrogen affects not only the wine's aroma profile but also its perceived style. The scope for modulating aroma profile and style can be considerable when making wine from musts having initially low assimilable nitrogen content.

Yeast possessess a remarkable ability to sense its environment, which triggers metabolic responses to enable acclimatization to hardships or opportunities. In addition to physical and chemical stresses, such as temperature and acidity, yeast also senses nutrient status.

In fact, yeast responds to the presence and amounts of nutrients in its immediate environment by tailoring its metabolism accordingly. Consequently, the profile of fermentation-derived aroma active metabolites (esters, alcohols, carbonyls, volatile fatty acids, and volatile sulfur compounds) reflects a yeast's genetically determined metabolic response to its immediate environment (grape must).

Grape must provides all of the nutrient requirements for yeast, usually in sufficient concentrations, to enable complete fermentation. This paper focuses on nitrogen sources, which, in grape must, are predominantly organic (amino acids, peptides) unless inorganic (ammonium salts) nitrogen has been used as a supplement.

In many viticultural regions around the world, limited nitrogen availability is an important constraint on vine development, which also restricts accumulation of amino nitrogen in the berry. This leads to nitrogen-deficient must, which can cause suboptimal (slow or sometimes "stuck") fermentations and hydrogen sulfide production. Consequently, ammonium salts have become widely used as a fermentation stimulant, especially when grape must is deficient in yeast assimilable nitrogen (YAN). Despite its wide application, the impact that inorganic nitrogen has on wine flavor, especially sensory profile, is poorly understood.[3] We have initiated an investigation into this question for Albariño, Chardonnay, and Shiraz wines, however only white wines will be discussed here.

Fermentation nitrogen – general effects

The effects of nitrogen on the basic composition of wine have been determined mainly by studying the effects of adding diammonium phosphate (DAP) to model and grape juice/must media.[3] A wide range of assimilable nitrogen values have been studied, approximately 50 to 500 mg N/L, which reflects YAN values that are likely to be encountered in most viticultural regions. This results in a wide range of fermentation kinetics, from slow or stuck through moderate to fast,[3,4,8,10] that should be taken into account when considering DAP addition.

For low YAN juices, the addition of DAP necessary to achieve this range is large and may not be permitted under wine regulations in some countries. For example, U.S. wine regulations restrict nitrogen addition to 960 mg/L as (NH4)^{2}HPO4, which increases YAN by 203 mg N/L (DAP contains approximately 21% N).[12]

Australian wine regulations restrict DAP nitrogen addition indirectly by limiting total soluble phosphates in wine to 400 mg P/L; this being equivalent to 1700 mg/L DAP, assuming that the must previously contained no phosphates. Since must phosphate levels are highly variable,[9] phosphate analysis should be made before considering large additions of DAP.

The wine constituents showing greatest variation in response to nitrogen concentration are glycerol; malic, succinic and acetic acids; pH; titratable acidity, and sulfur dioxide. The general effects of DAP addition on these compounds are summarized in Figure 1.

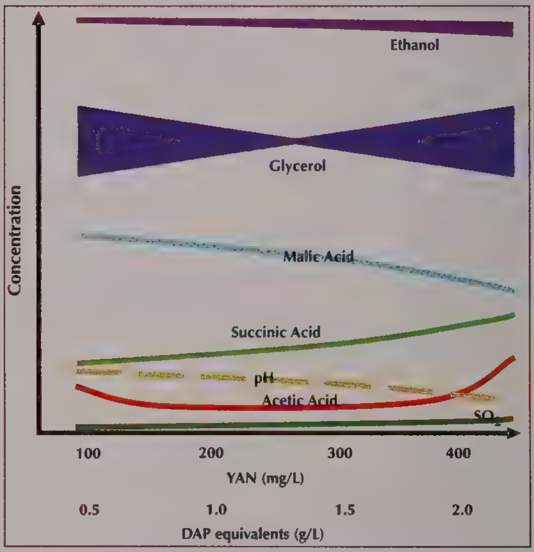


Figure I: Effect of DAP supplementation of low YAN medium on basic composition of wine. (Adapted from AWRI publication #1001.[4])

Ethanol and glycerol – DAP supplementation of model and authentic grape juice produces variable but small reductions in ethanol suggesting that DAP supplementation is not an effective strategy for reducing ethanol content of wine.

In laboratory studies, ethanol yield, which is calculated as the proportion of sugar that is converted into ethanol, is reduced by up to 10% when fermentation is performed in a synthetic medium containing ammonium nitrogen rather than amino acids as sole nitrogen source.[1] This reduction in ethanol yield results from the need to synthesize each amino acid from simple sugars and inorganic nitrogen. However, in studies with grape juice medium, in which amino acids are an importance source of YAN, DAP addition has produced variable results, ranging from no change to 0.7% (v/v) reduction,[4,8,13] further studies are required to understand this source of variability in ethanol yield.

Glycerol, on the other hand, varies widely in response to DAP supplementation (Figure 1). The pattern of glycerol production is dependent on the yeast strain and must composition, such that glycerol production varies to the greatest extent at low and high YAN concentrations.[4,8] Since glycerol production also responds to various stress conditions, such as osmotic stress imposed by over-ripe grapes or to grape solids, nitrogen supplementation cannot be used reliably to modulate wine glycerol content without knowledge of yeast characteristics and must composition.

Organic acids – Fermentation typically leads to a variable but small change in both volatile and non-volatile acids, depending on yeast strain and fermentation conditions. Because each acid serves different metabolic roles, the physiological regulation of each acid, including that by nitrogen, is different (Figure 1).[6]

Acetic acid, the major volatile acid in wine, is produced by yeast in response to various stresses, most notably osmotic stress, which results from high sugar concentration. Most yeast strains produce the lowest volatile acidity at moderate YAN values (around 200 to 250 mg N/L), which increases towards lower and greater nitrogen concentrations.[4,13]

Malic acid consumption is typically limited to less than 5% during fermentation; however, its consumption increases in response to higher YAN values, depending on the strain. Succinic acid, the major non-volatile acid produced by yeast, which can range 0.5 to 2 g/L, tends to increase as juice YAN increases.4,6 Abnormal amounts of succinic acid can result from high levels of γ-amino butyric acid, which forms in grape must under certain conditions.

These changes in the acid profile, which result from nitrogen supplementation, can contribute to a decrease in titratable acidity (TA) and pH. DAP addition of 0.5 g/L (100 mg/L YAN) can reduce TA by up to 1 g/L and pH by 0.1 unit, depending on yeast strain, and must composition and buffer capacity. Significant DAP addition can therefore affect perceived wine acidity. Further research is required to confirm whether beneficial changes to wine palate can be achieved within the constraints of legally permitted nitrogen addition in each country.

SO_2 – Most yeasts have been selected to produce little acetaldehyde and SO_2 during fermentation. In a low YAN medium, some strains produce more acetaldehyde and SO_2 in response to DAP addition.[8,16] This may increase the risk of MLF failure.

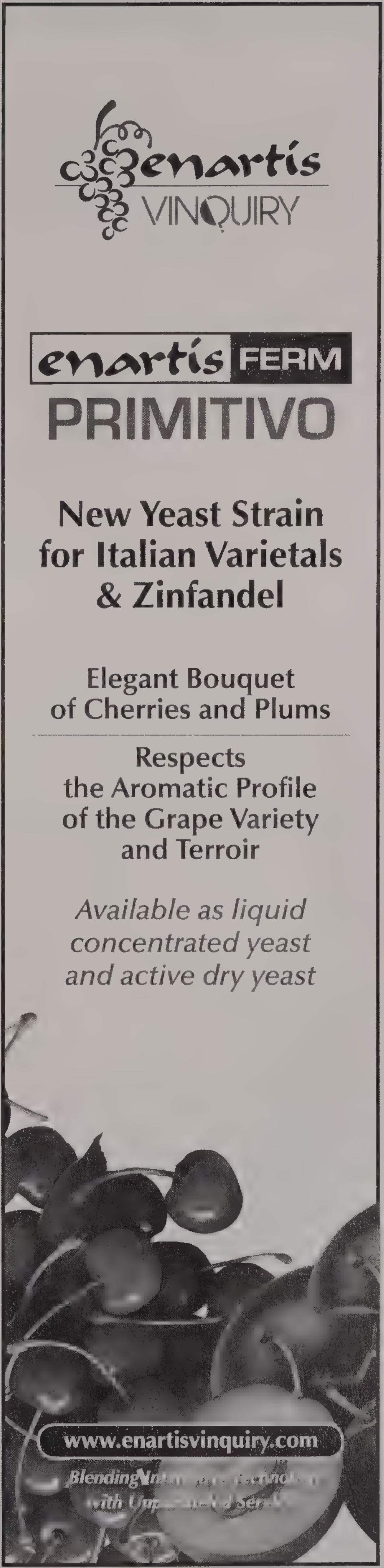
Fermentation nitrogen – effects on grape and yeast flavor-active compounds in Albariño

Albariño is an aromatic white grape variety which, like other floral varieties such as Riesling and Traminer, requires fermentation to reveal its varietal potential.[11] Its distinctive citrus, fruit character, which is, in part, derived from glycosidic precursors, results from hydrolytic release during fermentation.

Hydrolytic release of glycosidically-bound flavor compounds involves a combination of acidic and enzymatic catalyzed reactions. This variety, which dominates the northwest region of Spain and northern Portugal, is gaining rapid consumer acceptance in the New World, including Australia and the U.S.

In order to understand how DAP addition can modulate flavor contributions from the grape and the yeast, a Galician Albariño juice (20.5° Brix) with moderate YAN (250 mg N/L) was chosen for study. The control juice was supplemented with 0.5 and 1.0 g/L DAP to produce juices with 350 and 450 mg/L initial YAN concentrations, respectively. Fermentation was carried out with Vitilevure M05 at 18°C.[11]

Grape aroma compounds – Compared to control wines, moderate DAP addition (0.5 g/L DAP) produced wines with the highest concentration of varietal compounds, including free monoterpenes and norisoprenoids as well as most yeast-derived fermentation products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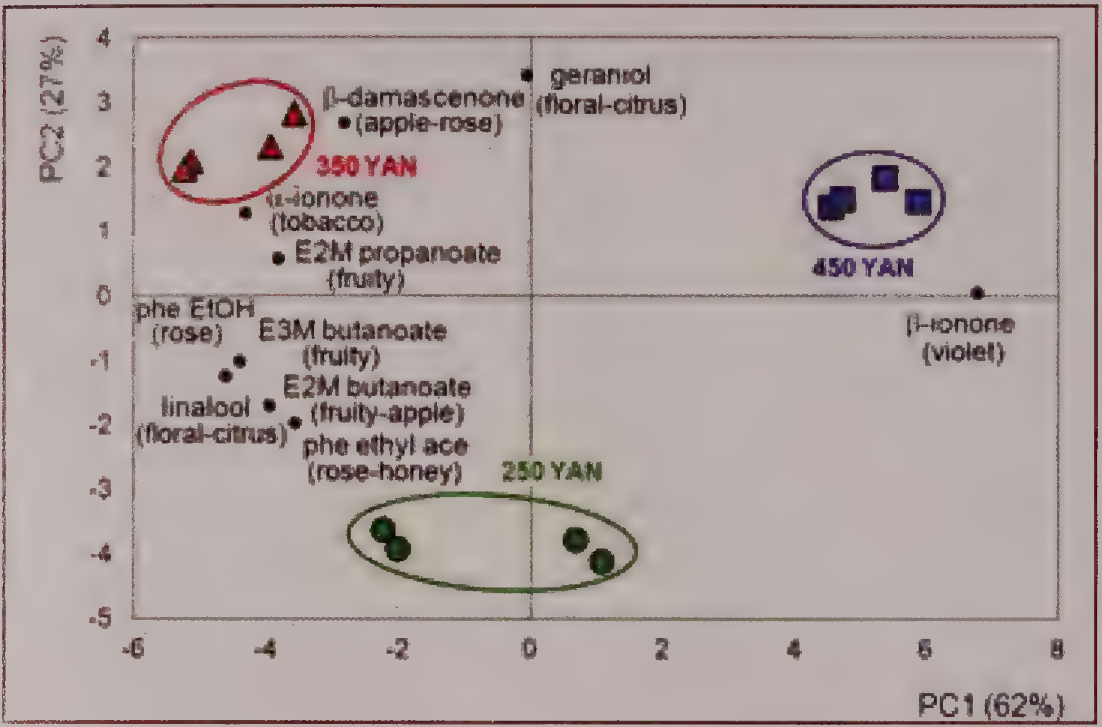

Figure 2: Principal component analysis of Albariño wines showing association between assimilable nitrogen (YAN) and grape and yeast aroma compounds. Control juice (250 mg/L YAN) was supplemented with 0.5 or 1.0 g/L DAP to achieve 350 and 450 mg/L YAN, respectively. Only potentially significant odor-active compounds (OAV greater than 1.0) are shown. (Adapted from AWRI publication #1375.[11])

(Figure 2). Only the statistically significant odor-active compounds are shown.

The important grape-derived aroma compounds analyzed were the monoterpenes, which included limonene (lemon note), linalool (floral, citrus) and α-terpineol (lilac), and the C13-norisoprenoids α-ionone (tobacco) and β-damascenone (apple, rose). At the highest YAN studied (450 mg/L), only β-ionone (violet) was present at its highest concentration.

In order to assess the likely sensory impact of these compounds on wine aroma as the result of DAP addition, an analysis of odor activities of the various volatile compounds was made. Of the six compounds with odor activity values (OAV) that exceeded 1.0, meaning that their concentration in wine exceeded their odor threshold concentration, five were significantly affected by DAP supplementation. This result suggests that DAP could be used to moderately modulate varietal character, at least in a floral variety. The impact

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of DAP on grape-derived varietal compounds backed up with sensory analysis requires closer attention.

Yeast aroma compounds – The impact of DAP on the sensorially important yeast-derived flavor compounds is summarized in Figure 2 together with the varietal compounds. Of the yeast-derived flavor compounds that were affected by DAP supplementation, 12 compounds, whose OAV were greater than 1.0, are potentially important to the sensory profile of wine.

The fruity ethyl esters, represented by nine compounds and especially ethyl butanoate and ethyl hexanoate, were highest with moderate DAP supplementation (350 mg/L YAN). Among the volatile fatty acids, hexanoic acid showed a significant contribution to wine aroma with large nitrogen addition. More detailed discussion of DAP modulation of yeast aroma compounds can be found in AWRI publication #137511 and in the section below on Chardonnay wine.

Overall, these results suggest that wines made with moderate DAP supplementation of juice already having moderate YAN content exhibit the largest potential aromatic impact, whereas large DAP addition reduces potential aromatic impact.

Fermentation nitrogen – effects on yeast flavor-active compounds in Chardonnay

Compared with floral varieties in which terpenes are major contributors to wine aroma, the aroma profile of non-floral varieties, such as Chardonnay, depends largely on grape C13-norisoprenoids and yeast-flavor compounds.[2] Chardonnay is a good example in which to study yeast contribution to wine aroma.

A Chardonnay juice (22° Brix), having low YAN (160 mg N/L), was chosen to investigate the effect of inorganic N (ammonium nitrogen) supplementation on the major aroma metabolites produced by yeast. Inorganic N was added to produce a wide range of initial YAN values ranging from 160 (low N), 320 (moderate N), to 480 (high N) mg N/L; the first value typically being just sufficient for risk-free fermentation whereas the latter typically exceeding yeast's total demand for nitrogen and leading to residual wine YAN.[3]

Fermentations were carried out with AWRI 796 yeast at 18° C. Fermentation duration was 13, 8, and 5 days for low, moderate, and high N juices, respectively.[8]

Supplementation of juices with ammonium nitrogen affected all yeast-derived aroma metabolites measured, including acetates, ethyl esters, higher alcohols (fusel alcohols), and volatile fatty acids.[4,10] The results are summarized in Figure 3.

Ethyl acetate, the major ester produced by yeast, increased in concentration from 40 mg/L to a maximum of 100 mg/L with the largest nitrogen addition, whereas total esters (excluding ethyl acetate) reached a maximum value at moderate nitrogen. Higher alcohols, on the other hand were inversely related

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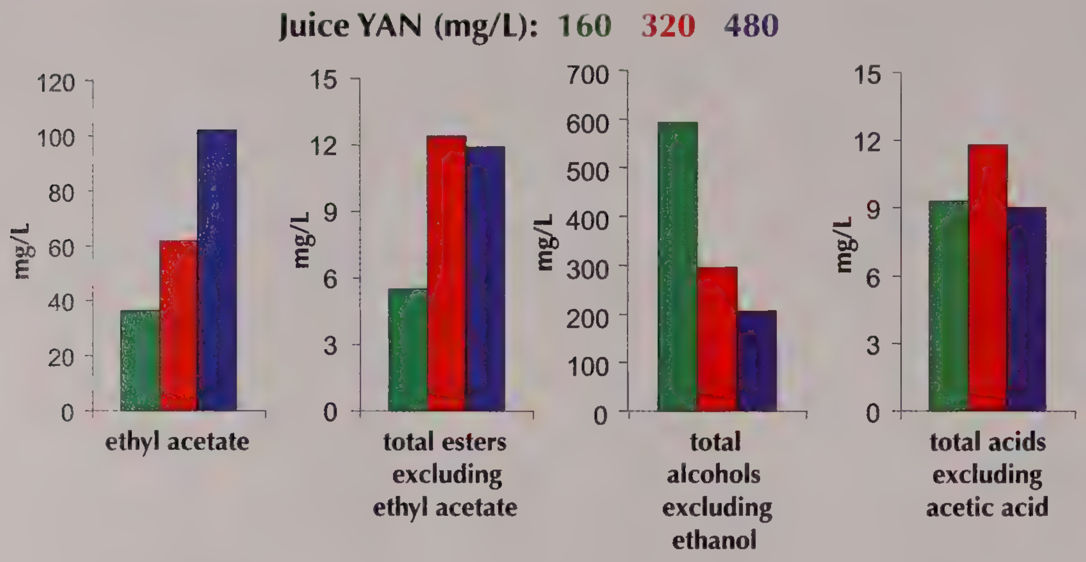

Figure 3: Effect of ammonium nitrogen supplementation on the formation of yeast aroma active metabolites. Clarified Chardonnay must (160 mg/L YAN) was supplemented with ammonium nitrogen to produce 320 and 480 mg/L YAN, and fermented with (Maurivin) AWRI 796. (Adapted from AWRI publication #1277.[8])

to YAN, such that their aroma impact strongly diminished. Volatile fatty acids showed a variable pattern.

Overall, nitrogen supplementation of Chardonnay strongly increases wine ester content and decreases the alcohol content, which results in wines acquiring a more fruity, floral aroma profile, as described in the following sensory section.

Since yeast strains vary widely in ester-producing capacity and their responses to nitrogen supplementation,[3,7,15,17] the results obtained in this Chardonnay trial should be considered a guide. Furthermore, the timing of DAP supplementation affects production of yeast aroma compounds, including H_2S, with early additions tending to have greatest impact.[13,14] Late DAP additions have reduced affect on aroma compounds, and increase the risk of residual nitrogen in finished wine.

Fermentation nitrogen – effect on sensory profile of inorganic vs organic Chardonnay

There has been little study on the effect of nitrogen supplementation on the sensory profile of wine, despite the fact that DAP is widely used in winemaking. The Chardonnay wines, referred to in the previous section, were profiled by quantitative sensory descriptive analysis.[8]

In addition to investigating the effect of inorganic nitrogen (ammonium nitrogen) on aroma profile, organic nitrogen was also studied. Composition of organic nitrogen supplement was based on amino acid analysis of the

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Chardonnay juice. This nitrogen supplement therefore more closely models the nitrogen composition of juices that have naturally moderate to high (480 mg/L) YAN content. Of course, other changes in grape must composition as the result of vineyard nitrogen application will not be modelled.[3]

Sensory analysis of wines made from the unsupplemented Chardonnay juice (160 mg/L YAN) reveals a complex aroma profile with the more prominent sensory descriptors being "acetic," "bruised apple," "stale beer," "cheese," and "sweat," whereas the fruity and floral descriptors received generally lower ratings (Figure 4). The low concentration of acetate and ethyl esters together with relatively high alcohol concentration suggests a chemical rationale for the sensory profile of the low YAN wines (Figure 3). The "sweat" and "cheese" attributes are likely to have resulted from volatile fatty acids that are more readily perceived in wines having a relatively low aroma intensity, which typically results from low juice YAN content.[7]

Moderate nitrogen supplementation (320 mg N/L) produces cleaner and more intense fruitier/floral wines, with prominent descriptors including "floral," "tropical," "fruit ester," and "banana" (Figure 4). These wines were characterized by increased total ester and reduced higher alcohol content compared to wines made from unsupplemented juice (Figure 3).

Perhaps surprisingly, whether inorganic or organic nitrogen supplements were used, the aroma profiles of the moderate nitrogen (320 mg N/L) wines were almost indistinguishable. This result suggests that winemakers have great flexibility in choice of products for moderate nitrogen supplementation, bearing in mind that some commercial organic nutrient products have very low YAN content.

Sensory profiles of wines made from high nitrogen supplemented juices, however, strongly depend on the type of nitrogen supplement used (Figure 4). Organic nitrogen (480 mg N/L) produced wines with the greatest intensity of fruitiness, in which the "floral," "tropical," "fruit ester," and "banana" descriptors were most highly rated.

On the other hand, wines produced from high nitrogen juices supplemented with inorganic nitrogen (480 mg N/L), were dominated by descriptors for volatile off-odors, giving a strong solvent character. The concomitant high concentration of ethyl acetate (100 mg/L) appears to be responsible for the masking-solvent odor (Figure 3).[8] This result clearly shows that only moderate additions of DAP should be made and that repeated additions of DAP, such as can occur during fermentatio rescue procedures, can substantially increase perceived wine "volatile acidity" due to excessive ethyl acetate production (N.B. the odor of ethyl acetate is often incorrectly referred to as volatile acidity).

The high aromatic impact of the organic nitrogen supplement is suggestive that grapes with naturally very high amino nitrogen might also have aromatic intensity. Further research is needed to show whether the grape-

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derived aroma compounds are likewise enhanced or, in fact, simply masked by the intense yeast aroma compounds.

Conclusions

These studies reveal complex interactions between nitrogen supplementation and grape- and yeast-derived aroma compounds, which can, however, be exploited to modulate wine aroma and style. Low YAN fruit provides the greatest opportunity for managing the flavor profile.

In general, musts with low available nitrogen reduce yeast growth and metabolic activity, which result in lower production of yeast aroma compounds, with the exception of the higher alcohols, to give a low aromatic intensity of more complex but less fruity attributes. Such musts are also at greater risk of slow or stuck fermentation and wines acquiring "reductive" attributes.

Added nitrogen, whether organic or inorganic, stimulates yeast growth and the production of aroma compounds, which intensifies perceived aroma. This also increases the balance of fruity and floral esters relative to the more savory higher alcohols, thereby masking complex aromas and emphasizing a fruity profile. This experimental result suggests that moderate use of DAP might produce a similar aroma profile to that which results from grapes with naturally higher YAN content. Results from the Albariño study further suggest that moderate DAP use can enhance some varietal compounds.

Large additions of nitrogen should only be made with great caution; when inorganic nitrogen is used, such as DAP, there is an increased risk of high residual phosphate and a large risk of excessive acetate production. Ethyl acetate, in particular, produces an undesirable "perceived volatile acidity," solvent character, thereby masking desirable aroma attributes.

Addition of a large amount of organic nitrogen (an experimental mixture of amino acids and ammonium) significantly intensifies the fruity aroma profile, but the risk of masking varietal character remains an open question. However, it is not yet technically feasible, or even desirable, to use such large concentrations of organic nitrogen (most commercial preparations of organic nutrients, such as those derived from inactivated yeast, have low YAN content), except that which results naturally from high vigor vineyards.

While the investigation with Albariño suggests that YAN can also increase the varietal impact of wine, at least for some combination of varieties and yeast strains,[6] the impact should not be overestimated. Furthermore, it should be noted that some yeast strains, such as AWRI 796, are highly responsive to DAP addition and therefore, in young wines, the high ester production can partially

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mask varietal character. Winemaker feedback suggests that such wines maintain fruit and varietal character during ageing better, however.

In order to best manage wine flavor it is necessary to determine the assimilable nitrogen content and use DAP according to the style of wine required; winery trials are essential to determine whether DAP supplementation is beneficial with particular combinations of grape variety and yeast strain. Broadly similar flavor affects are also achieved in red wine varieties.[5,7] ■

[This text was first published in the Australian & New Zealand Grapegrower & Winemaker, *June, 2012, and is edited and reproduced here with kind permission of the publisher, Winetitles.com.au.]*

Acknowledgements

The authors acknowledge financial support by grants from the Spanish Government. Research at The Australian Wine Research Institute is supported by Australia's grapegrowers and winemakers through their investment agency the Grape and Wine Research and Development Corporation, with matching funds from the Australian Government. The AWRI is a member of the Wine Innovation Cluster. Paul Henschke may be reached at paul.henschke@awri.com.au

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Sculpting wine's aromatic profile through DIACETYL management

BY Sibylle Krieger, Magali Déléris-Bou, Ann Dumont, and José Maria Heras
Lallemand Germany, France, Canada, Spain

IN addition to carrying out the bio-deacidification of wine, malolactic bacteria (MLB) influence aroma and flavor by various mechanisms, including the production of volatile grape and yeast-derived metabolites. In wine, one of those volatiles, diacetyl, has important stylistic implications. This diketone, also known as 2,3-butanedione, is associated with the "buttery" character of wine and is formed as an intermediate metabolite in the reductive decarboxylation of pyruvic acid to 2,3-butanediol (Figure 1).

The formation and degradation of diacetyl is closely linked to the growth of such MLB as *Oenococcus oeni* and the metabolism of sugar, malic acid, and citric acid. Yeast are also able to synthesize diacetyl during alcoholic fermentation, however, the majority of this diacetyl is further metabolized to acetoin and 2,3 butanediol. This article will review winemaking practices and the latest findings to help modulate diacetyl content in wine through malolactic fermentation (MLF).

Do I smell butter?

Diacetyl at low concentrations and in combinations with other wine aroma compounds will impart yeasty, nutty, toasty aromas.[4,7] At high concentrations, it has a characteristic buttery aroma that is associated with a malolactic character.

The sensory threshold of diacetyl in wine has been shown to strongly depend upon the style and type of wine, varying from 0.2 mg/L threshold for Chardonnay wine, 0.9 mg/L for Pinot Noir, to 2.8 mg/L for Cabernet Sauvignon wine.[8,5]

When present at a high concentration (exceeding 5-7 mg/L), diacetyl is regarded by consumers to be undesirable in the wine, whereas, at around 1-4 mg/L, and depending on the style and type of wine, it is considered to contribute a desirable "buttery" or "butterscotch" flavor character.[8,3]

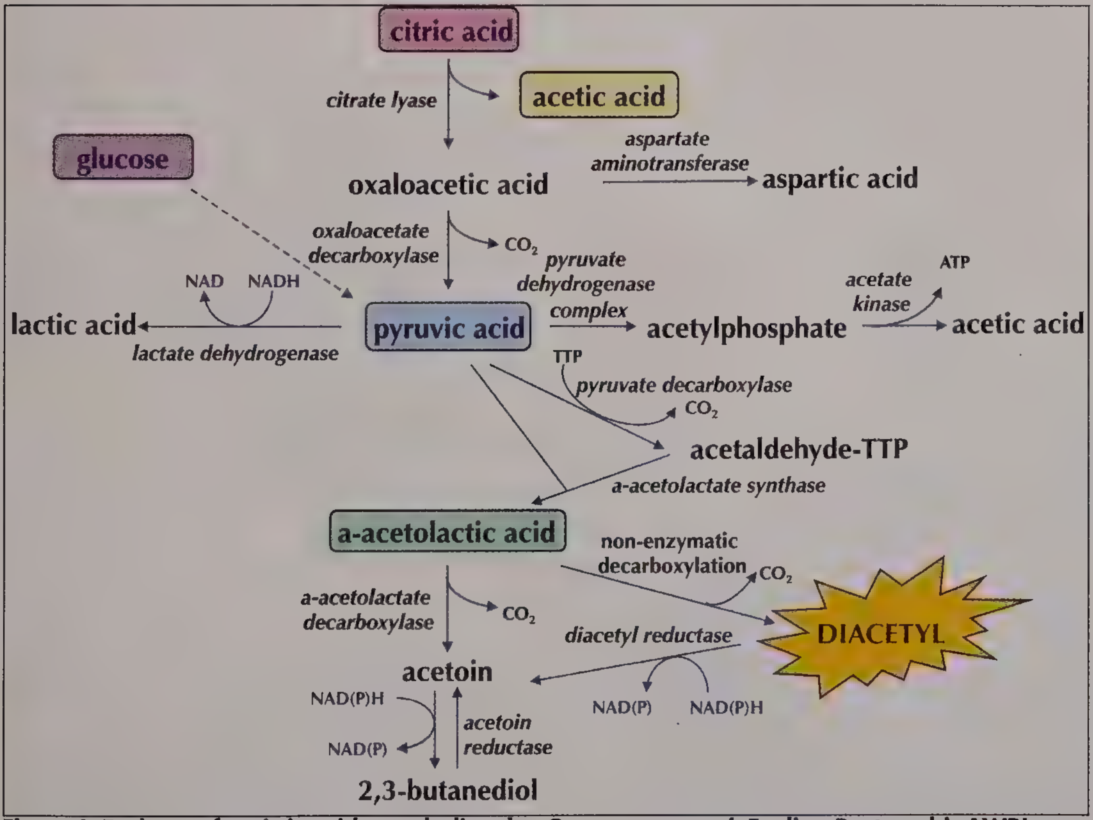

Figure I: Pathway for citric acid metabolism by *Oenococcus oeni*. Eveline Bartowski, AWRI, adapted from Ramos et al. 1995.

What winemaking practices influence diacetyl content in wine?

The selected MLB strain impact, when inoculated post-alcohol fermentation (AF), on diacetyl production – When MLF is desired, the MLB appears to be an important control point to influence the final diacetyl concentration. Formation and degradation of diacetyl is closely linked to the growth of the MLB strain and its metabolism of sugar, malic acid, and citric acid.

Certain MLB strains have been observed to produce a higher residual concentration of diacetyl in wines than other strains, principally when post-AF inoculation is used for MLF.

In an AWRI study by Eveline Bartowsky (2011) in Cabernet Sauvignon wines in Southern Australia, the results show that some MLB strains will produce significantly different concentrations of diacetyl during post-AF inoculation (Figure 2).[1] We can see that in both Cabernet Sauvignon wines, the MLB produced different levels of diacetyl, ranging from 4 to 14 mg/L. In both cases, the wines that had undergone MLF with the VP41 (R1105) MLB had the lowest levels of diacetyl, whereas Beta (R1106), and 49A1 (R1123) MLB strains had the highest level.

Citric acid and diacetyl production

Most strains of *O. oeni* are able to metabolize citric acid during MLF. The metabolism of citric acid is highly strain-dependant relative to that of malic acid. Higher peak concentrations of diacetyl generally correlate with an elevated concentration of citric acid. However, the magnitude of the relationship depends on many other factors

The metabolism of citric acid usually starts later than the degradation of malic acid. There is a significant variation among *O. oeni* strains in terms of timing and speed of citric acid degradation. Some strains such as Beta attack citric acid during the middle of MLF, whereas strains such as VP41, which normally produces small amounts of diacetyl (Figure 2), will attack citric acid at the end or just after completion of MLF. This would allow a winemaker to stabilize the wine just after MLF and limit diacetyl production.

Some MLB strains are characterized as unable to metabolize citric acid and

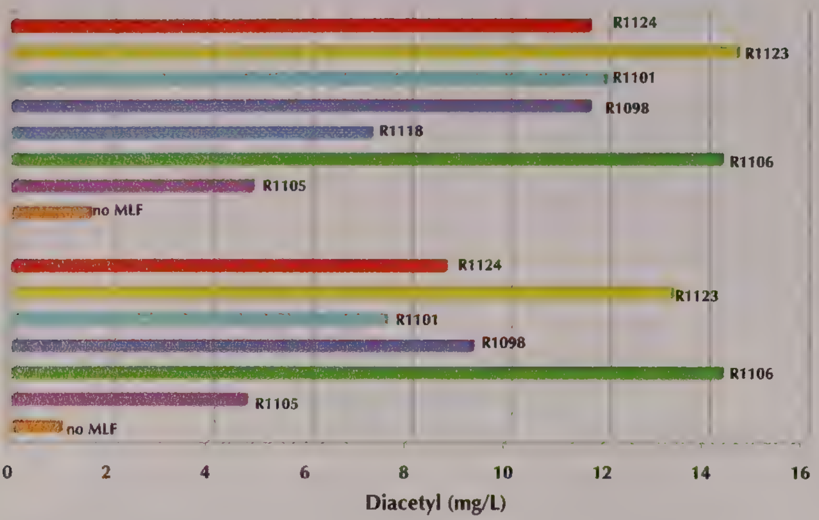

Figure 2: Diacetyl concentration of two Cabernet Sauvignon wines from Clare Valley and Adelaide Hills, Australia that have undergone post-AF inoculation with different selected MLB.

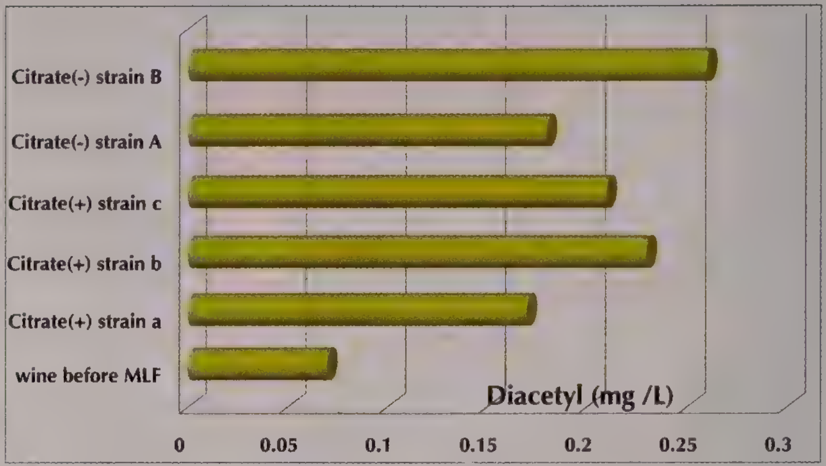

Figure 3: Diacetyl concentrations in a 2009 Chardonnay (Baden, Germany) after induced MLF by different ML starter strains using post-AF inoculation.

were thought to remove any possibilities of diacetyl production as diacetyl is a by-product of citric acid degradation via pyruvic acid and α-acetolactic acid (Figure 1). However, this is not the only mechanism involved in production of diacetyl since pyruvic acid is an intermediate metabolite, which can also derive diacetyl from the glucose metabolism in the must.

In a 2009 Chardonnay study (Baden Germany), diacetyl production from different selected MLB was compared. We know that the diacetyl concentration is strain-dependant in post-AF MLB inoculation, but in this trial it does not appear that the characteristic of not being able to metabolize citric acid was that significant in lowering the level of diacetyl compared to the impact of the strain itself. For example, all MLB strains in the 2009 Chardonnay trial (Figure 3) had similar diacetyl production regardless if the MLF was carried out by 'citrate negative' (-) or 'citrate positive' (+) MLB strains.

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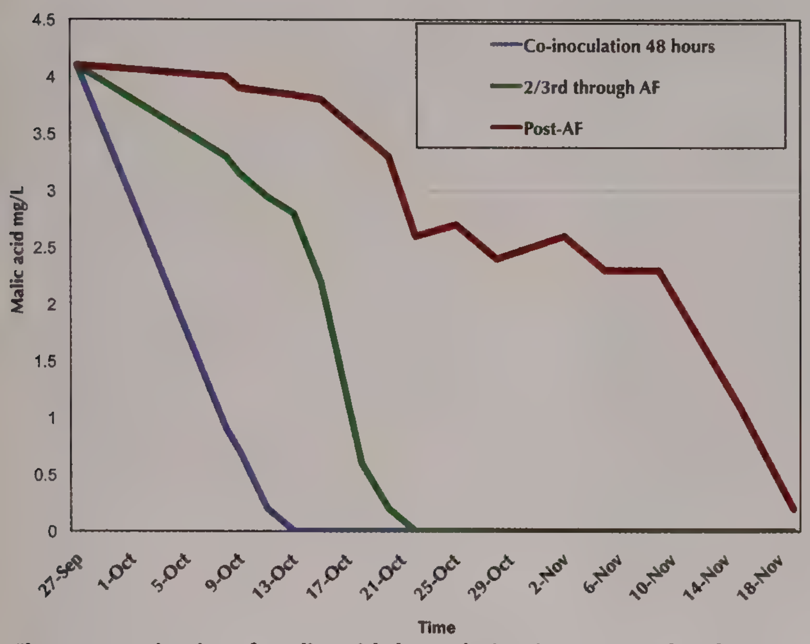

Figure 4A: Kinetics of malic acid degradation in a 2010 Chardonnay (Val de Loire) inoculated with Beta using different timing of Enoferm Beta MLB inoculation.

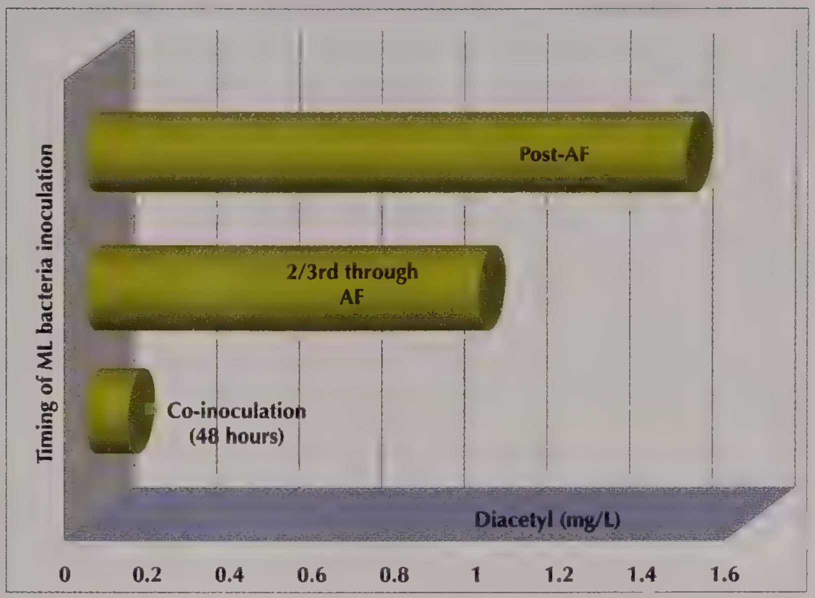

Figure 4B: Diacetyl concentration in a 2010 Chardonnay (Val de Loire) with different timing of inoculation for MLF with Enoferm Beta MLB.

Lowering diacetyl content during co-inoculation

Co-inoculation of selected yeast and MLB also has important stylistic implication in terms of diacetyl production. Whether or not co-inoculation is to be used for MLF is probably the most important decision during this step of winemaking.

Co-inoculation of yeast and MLB (inoculation of the MLB 24- to 48 hours after yeast inoculation), allows an acclimatization of the MLB during alcoholic fermentation and an early start of malic acid degradation towards the end or immediately after alcoholic fermenta-

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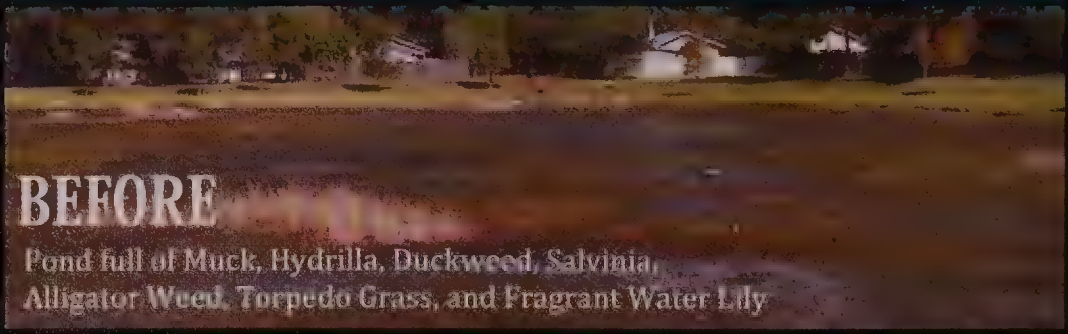
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tion when yeast cells are still alive. Under these reductive conditions, diacetyl is immediately reduced to acetoin then 2,3-butandiol which has little sensory impact because it has a much higher taste threshold and consequently, resulting in a wine with very little lactic and buttery flavors.

In a co-inoculation situation, there is earlier stabilization of a wine. Our studies have shown that co-inoculation often results in more fresh fruit wine styles as opposed to lactic, buttery, nutty styles that result from post-AF inoculated MLF. Figure 4A shows malic acid degradation in a 2010 Chardonnay (Val de Loire, France), inoculated with Enoferm Beta MLB strain and Figure 4B highlights the corresponding diacetyl concentrations. Enoferm Beta produces less diacetyl when co-inoculated (48 hours) than during a delayed inoculation (2/3 AF) or during post-AF inoculation. The impact of the MLB strain is not as strong when co-inoculated since the wines consistently have lower levels of diacetyl with this winemaking technique even when using different MLB.

Other winemaking techniques to manage diacetyl

Many other winemaking procedures can influence diacetyl content in wine, and therefore influence the wine style desired:

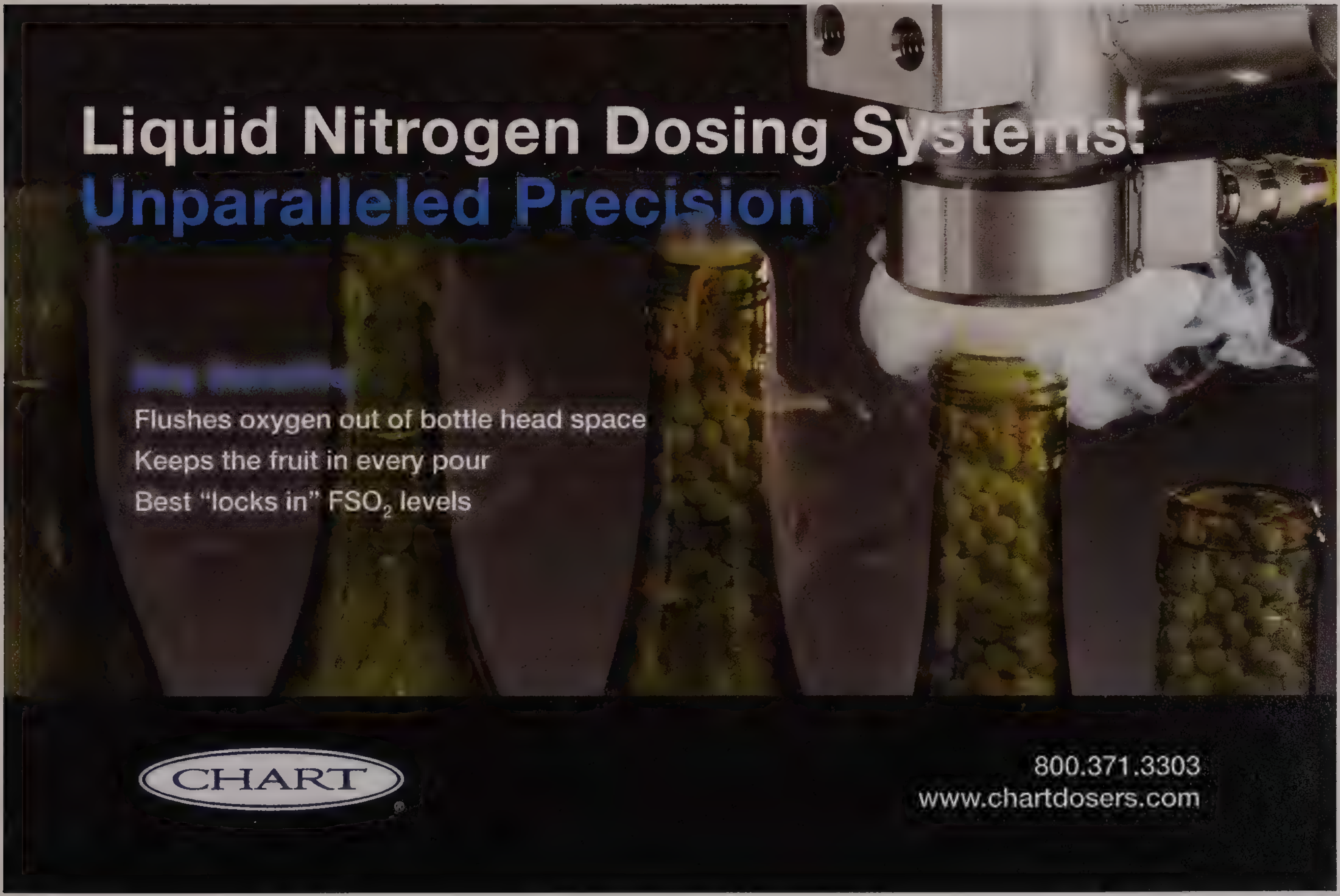
1. The bacteria inoculation rate affects the time for induction and completion of MLF. Selected MLB starter cultures typically deliver 0.5 - 5 x 10^6 cfu of bacteria per mL wine which is the critical biomass necessary to induce malic acid degradation. It has been observed that a lower inoculation rate, such as in 10^4-10^5 cfu/mL, can result in higher diacetyl accumulation in wine as high as an 8-fold increase, because of the additional growth needed to reach the critical bacteria population to start MLF.
2. The conversion of α-acetolactate to diacetyl is a non-enzymatic decarboxylation that is enhanced by the presence of oxygen. A trial done by J.C. Nielsen and M. Richelieu,[6] showed that the amount of diacetyl that accumulated in the wine varied greatly, with the formation of 2 mg/L under anaerobic conditions

and 12 mg/L under semi-aerobic conditions.

3. MLF conducted at lower temperatures, such as 64°F rather than 77°F, tends to be slower, but wines accumulate a higher concentration of diacetyl. This is also due to changes in the redox potential of the wine – the longer the MLF the less reductive consequently, the wine environment becomes more oxidative due to the yeast die-off and diacetyl will be no longer be reduced to acetoin and butanediol.
4. SO_2 is able to interact with diacetyl in a reversible manner. In the presence of SO_2, diacetyl will be reduced and the concentration of free diacetyl in wine is lowered, however as the SO_2 content decreases, as for example during élevage, the ratio of free diacetyl will increase again, thus increasing its sensory impact.
5. The extended contact with yeast lees also has an effect on diacetyl concentration. As *Saccharomyces*

Table I: Factors affecting the diacetyl content of wine (adapted from Bartowsky & Henschke, 2004)

Winemaking factors	Diacetyl ↑	Diacetyl ↓
ML bacteria strain	*O.oeni* strains vary in production of diacetyl	
Wine type	Red wine	White wine
Inoculation rate of ML bacteria	Low (10^4 cfu/mL)	High (10^6 cfu/mL)
Presence of active yeast cells (lees contact)	Clarified or filtered wine dead lees	Yeast contact active lees
Oxygen exposure of wine during MLF	Exposed to oxygen	Reductive conditions
SO_2 content		Addition binds diacetyl, which renders sensorily inactive
Citric acid concentration	Favors production, though acetic acid is also produced	
Temperature during MLF	Low (e.g. 65°F)	High (e.g. 77°F)
Wine pH at which MLF is conducted	Low pH	High pH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cerevisiae wine yeasts are capable of synthesizing diacetyl and degrading it, the presence of yeast lees, especially when stirred, can further reduce the wine diacetyl content.

Summary

The winemaker's management of malolactic fermentation can be a powerful tool to shape wine style and influence the diacetyl content and the resulting buttery character in a wine. To properly modulate the contribution of this character, several winemaking procedures can be applied to achieve the desired effect, from a major impact to a slight one.

Two of the most important factors are the choice of selected malolactic bacteria used to achieve malolactic fermentation, and timing of inoculation with those bacteria. Lallemand's research on malolactic bacteria characterization for diacetyl allows us to better understand malolactic bacteria and recommend those required to influence the production of desired compounds.

In post-alcoholic fermentation inoculation, some strains of malolactic bacteria, such as the VP41 and the Lalvin 31 are recognized as low producers, whereas PN4 and Beta are higher producers.

The timing of inoculation with bacteria starters is very important, as co-inoculation will always yield lower diacetyl levels in wines, so low in fact that we can propose very low diacetyl solutions through co-inoculation. Table I summarizes the winemaking techniques that are the most successful to impact the diacetyl level and help define a more buttery or a more fresh fruit-style wine. ■

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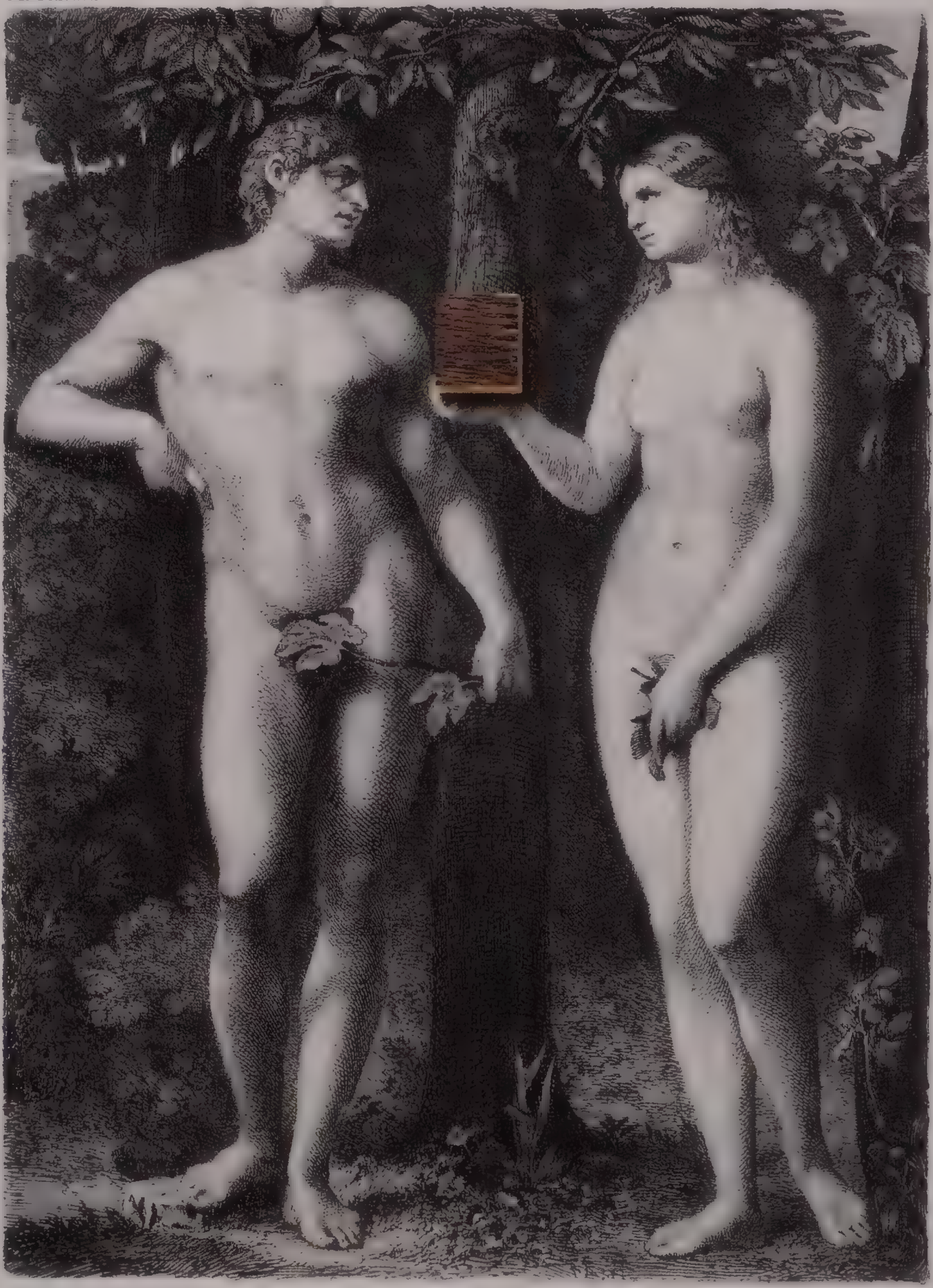

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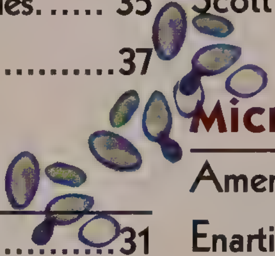

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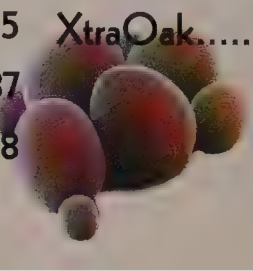

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LAFFORT USA, INC.

LAFFORT USA distributes a range of LAFFORT products directly in the U.S., with a team of experts including three former winemakers as Technical Sales Support – David Douglas, Jillian Johnson, and Michael Kafka, and a Technical Manager, Dr. Peter Salamone. LAFFORT USA has moved to a larger office and warehouse in Petaluma, CA to better serve North America customers.

LAFFORT introduces alternative techniques to traditional chilling for potassium tartrate stabilization: CELSTAB® CMC product is a pure CMC highly effective on white wines, and MANNOSTAB® is a pure yeast Mannoproteins preparation (OMRI Listed) to efficiently stabilize both reds and whites.

LAFFORT

l'œnologie par nature

LAFFORT introduces liquid enzymes for the 2012 harvest: the popular LAFAZYM CL is now available in a liquid version for white juice settling and wine clarification. For red must treated with flash détente, LAFASE THERMO LIQUID will help with clarification.

Nutrients are a special focus for LAFFORT USA in 2012, with exciting new results on the complete nutrition regime, from yeast rehydration to nutrition during fermentation.

BIOLEES, QUERTANIN products, Zymaflore FX10 and F15, VL3 and X5, DYNASTART, Lafase HE GRAND CRU, Tanin VR SUPRA, GECOLL SUPRA, and STABIVIN SP are other LAFFORT products.

For more information, contact:

Laffort USA, Inc.
tel: 707/775-4530
e-mail: charlotte.gourraud@laffort.com; laffortusa@laffort.com
website: www.laffort.com; www.laffortusa.com

PLEASE SEE LAFFORT AD, PAGE 17.

CANTON COOPERAGE

Canton Cooperage is focused on offering the highest quality American oak barrels, which are produced by:

- Selecting high-quality tight-grain American oak;
- Naturally open-air seasoning the staves up to 48 months (certified);
- Toasting the barrels precisely, with computerized monitoring;
- Using the latest technology and cooper's craft in a modern facility;
- Applying HACCP process; full traceability and food safety controls (certified);
- Developing new techniques based on The Chêne Group's R&D, with cooperage partners Tonnellerie Taransaud in France, and Kadar in Hungary;
- Improving performance for sustainability development.

CANTON
Grand Cru
NATURALLY SEASONED 4 YEAR WOOD

For white wine fermentation, the Canton Grand Cru barrel's 3- and 4-year seasonings are used in many premium programs for Chardonnay, Sauvignon Blanc, and other international white varietals. These barrels contribute a refined balance of sweetness, light spices, minerality, and subtle floral notes.

For extended aging of red varietals, such as Cabernet, Merlot, Syrah, Zinfandel, Tempranillo, Malbec, and Pinot Noir, the Canton barrel contributes an exquisite balance and complexity, enhances structure, and lengthens the mid palate and finish.

Grand Cru barrels are available in 200L, 225L, 228L, 265L, 300L, and 500L.

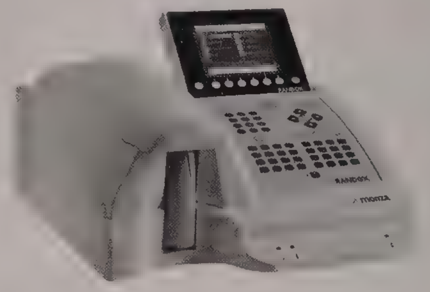
For more information, contact:

Canton Cooperage
5803 Skylane Blvd., Ste C, Windsor, CA 95492
tel: 707/836-9742; fax: 707/836-9759
website: www.cantoncooperage.com

PLEASE SEE CANTON COOPERAGE AD, PAGE 91.

RANDOX FOOD DIAGNOSTICS

Randox Food Diagnostics is an associate of Randox Laboratories, with 30 years' experience in the diagnostic market, and a devoted research and development team. Randox Food Diagnostics offers the RX Monza starter package for wine, beverage, and fermentation industries.



The RX Monza is a compact semi-automated analyzer for use in testing wine, grapes, and fruit juices. It is ideally suited for first-time testing in the wine and beverage industry. Performing tests is easy and straightforward, with simple procedures and onboard step-by-step instructions, making this high performance analyzer suited to any level of experience or expertise. The starter package includes the RX Monza analyzer and service kit, the RX Monza incubator, free test kit of choice, training and installation, pipettes, pipette tips, cuvettes, and open-channeled system. It's also compatible to non-Randox kits.

Current tests offered include ammonia, ethanol, lactic acid, potassium, acetic acid, glucose/fructose, malic acid, total antioxidant status, and copper. A range of tests currently in development includes citric acid, tartaric acid, NOPA, iron, free + total $S0_2$.

Quality control before, during and after the production process in food and beverage manufacture is vitally important, using our kits to monitor this process will ensure cost-effective production of high quality wines.

For more information, contact:

Randox Food Diagnostics
515 Industrial Blvd, Kearneysville, WV 25430
tel: 304/728-2890; fax: 304/728-1890
e-mail: enquiries@randoxfooddiagnostics.com
website: www. randoxfooddiagnostics.com

PLEASE SEE RANDOX AD, PAGE 84.

AMERICAN TARTARIC PRODUCTS, INC.

For years, winemakers have added oxygen to wine – it has only been in the last decade that specific tools for this task became available. Parsec has revolutionized micro-oxygenation technology by offering the only system that supplies oxygen by weight instead of volume.

When releasing a potentially dangerous gas like oxygen in a wine tank, you have to be absolutely sure that the quantity you release is precise, in order to be able to repeat it. There is a wide range of equipment that measures oxygen dose by volume (ml). A liter of gas can be a very small quantity (at low pressure and high temperature) or very large quantity (at high pressure and low temperature). To measure gas by liter, a winemaker must refer to a specific pressure and a specific temperature.

Usually, micro-oxygenation equipment is fed by a gas cylinder, and the pressure-reduction gears are not able to provide a precise pressure value. Parsec systems have taken this into account by measuring the weight of the oxygen molecule, temperature, and pressure to the micro-second with no calibrating, assuring the most accurate system available today. Systems are available from one to 120 units and are PC-compatible.

For more information, contact:
American Tartaric Products, Inc.
1230 Shiloh Rd., Windsor, CA 95492
tel: 707/836-6840; fax: 707/836-6843
e-mail: bill@americantartaric.com
website: www.americantartaric.com

PLEASE SEE AMERICAN TARTARIC AD, PAGE 24.

XTRAOAK

XTRAOAK has provided the highest quality French and American oak alternatives to winemakers for nearly 30 years, focusing on:

Cooperage grade selection of wood;
- Natural, open-air seasoning;
- Consistent convection toasting;
- HACCP process/traceability;
- Research/development;
- Innovation, for ease of use;
- Technical expertise.

For fermentation or aging of white and red wines, XTRAOAK offers chips, granular, barrel inserts, "Oak-on-a-Rope," "Xoakers," "Stavettes," and fan assembly.

In addition to Classic toasts (light, medium, and medium plus), XTRAOAK has developed five unique proprietary "Toast Blends": French "Naturelle" Series, French "Clair," French "Roti," American "Spectrum," and American "Bold." These blends offer complex flavors and aromas, ranging from the bright minerality of lighter toasts, to the spicy, caramelized sweetness of darker toasts.

After three years of use in Europe, the Xtrachêne Stick 22.90 is presented by XTRAOAK to the U.S. This unique French or American oak product for use in tanks, is convection or fire-toasted. The square shape and barrel stave thickness, favors a progressive diffusion of oak compounds during fermentation and aging, resulting in aromatic complexity, enhancing the fruit, and bringing structure to the wine.

For more information, contact:
XTRAOAK
5803 Skylane Blvd. Ste. C, Windsor, CA 95492
tel: 707/836-9742; fax: 707/836-9759
websites: www.xtraoak.com/store.xtraoak.com

PLEASE SEE XTRAOAK AD, PAGE 89.

GUSMER ENTERPRISES

This year, Gusmer Enterprises offers a wider-than-ever range of new and innovative winemaking tools to allow winemakers to express themselves through unique and interesting wines.

With winemaking tools like three new pure non-*Saccharomyces* yeast strains, a diacetyl-free malolactic bacteria strain, mannoproteins for cold stabilization, and the latest in fermentation nutrients, the options for expression have never been better.

Gusmer has teamed up with some of the biggest and most innovative suppliers in the food industry, to focus efforts on new and novel winemaking tools to add to an already expansive product offering.

Gusmer Enterprises offers a full range of:
- Direct inoculation bacteria;
- Non-*Saccharomyces* and *Saccharomyces cerevisiae* yeasts;
- Powder and time-release format fermentation nutrients;
- Domestically-produced filter media;
- Fining agents;
- Enzymes for winemaking;
- Domestically-produced oak alternatives;
- Lab supplies, and more.

Learn more at www.gusmerenterprises.com

For more information contact:
Gusmer Enterprises
81 M St., Fresno, CA 93721
tel: 559/485-2692; fax: 559/485-4254
e-mail: sales@gusmerenterprises.com
website: www.gusmerwine.com

PLEASE SEE GUSMER ENTERPRISES AD, PAGE 3.

LALLEMAND

Lallemand's expertise in wine fermentation has been successfully applied to the selection, characterization, and production of natural yeast and bacteria. These yeast and bacteria selections respond to the needs of winemakers to control fermentations while promoting the expression of a particular style of wine, and respecting terroir.

New offerings from Lallemand include:

Vitilevure 3001™ winemaking yeast selected from the prestigious Côte de Nuits terroir in Burgundy. This selection is the result of three years of laboratory and cellar trials in Pinot Noir with the Laboratory Burgundia Oenologie in Beaune.

No Brett Inside™ natural polysaccharide extracted from a fungal source of chitin (Aspergillus niger). No Brett Inside removes Brettanomyces from wine when treated post-MLF. To use No Brett Inside, suspend it in water or wine, then add to the wine to be treated, and mix. After 10 days of contact time, the treated wine should be racked and separated from the lees.

No Brett Inside is allowed by the European Union, FDA GRAS Notice No. 000397. TTB letterhead approval required.

For more information, contact:

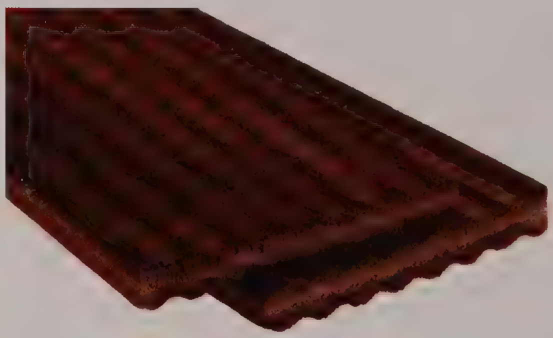
Lallemand
PO Box 5512, Petaluma, CA 94955
tel: 707/526-9809; fax: 707/526-9803
Gordon Specht: gspecht@lallemand.com,
Sigrid Gertsen-Briand: sigrid@lallemand.com,
Shirley Molinari: smolinari@lallemand.com
website: www.lallemandwine.us

PLEASE SEE LALLEMAND AD, PAGE 21.

OAK SOLUTIONS GROUP

ēvOAK by Oak Solutions Group has introduced the third addition to its Cuvée Series of specialty tank staves. French for blend, the Cuvée Series offers tank staves that are formulated with certain flavor characteristics in mind.

Cuvée N° 3 Espresso Toast is designed for winemakers seeking complex layers of dark toasty flavor. The opulent flavor blend includes concentrated notes of coffee and bittersweet chocolate. The balance of roasted flavors across the toast gradient makes this tank stave an excellent choice for a variety of wine styles and varietals.



To create distinct espresso character, the Oak Solutions team designed an innovative stave contour that toasts differently than the traditional stave shape. Instead of having a smooth surface, Cuvée N° 3 Espresso Toast tank staves are planed with a rippled silhouette. The resulting ridges toast more quickly than the grooved portion of the stave, and also radiate heat deeper into the underlying layers of oak. When combined with infrared toasting technology, this creates a gradient of dark roasted flavors.

Oak Solutions Group is a premium oak products company, providing expert advice, niche products, and unparalleled selection. In 2012, the company is celebrating its 100th year in the coopering industry.

Sample kits are available.

For more information, contact:

Oak Solutions Group
Paul Abbott, Oak Solutions Specialist
2557 Napa Valley Corp. Dr., Ste. D,
Napa, CA 94558
tel: 707/259-4988; fax: 707/294-6363
e-mail: pabbott@oaksolutionsgroup.com
OR Amy LaHue, Oak Solutions Specialist
tel: 573/442-9717; fax: 573/442-2012
e-mail: alahue@oaksolutionsgroup.com
website: www.oaksolutionsgroup.com

UNITECH SCIENTIFIC LLC

Unitech offers 26 essential wine chemistry reagents for spectrophotometry. The wine reagent line includes glucose/fructose, malic, ammonia, primary amino nitrogen (NOPA), acetic acid, free and total sulfites – plus enzymes (HK, MDH, etc.), NAD, and multi-level standard sets.

Unitech also features three wine analyzers: the ChemWell for Wine (200 tests/hour), the EnoLyzer (semi-automated and affordable) and a new ChemWell-T for Wine (100 tests/hour). These systems produce quantitative results for each set of chemistries. They are flexible, easy to use, reliable, and very accurate.

In addition, Unitech distributes instrumentation from YSI, Hanna Instruments, and Atago USA, as well as a wine microbiology "made easy" line for *Brettanomyces*, bacteria, and yeast detection.

Unitech offers reagent, assay protocol, and hardware expertise. Unitech is proud of their great product quality, service, and customer loyalty.

For more information, contact:

Unitech Scientific LLC
12026 Centralia Road, Ste H
Hawaiian Gardens, CA 90716
tel: 562/924-5150; fax: 562/809-3140
e-mail: info@unitechscientific.com
website: www.unitechscientific.com

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NAPA FERMENTATION SUPPLIES

New for 2010: Napa Fermentation Supplies will now be a distributor of Laffort yeast and winemaking products!

Napa Fermentation has an extensive array of winemaking supplies, including:

- Winemaking kits and ingredients;
- Wine yeast, nutrients, and malolactic cultures;
- Stoppers, bungs, spigots, wine hose, tubing;
- Labware, refractometers, and chemicals;
- Wine thieves;
- Oak products;
- Fermentation locks, buckets, and fermentors.

Napa Fermentation offers Lalvin fermentation supplies, including 23 strains of wine yeast and enzyme products. Malolactic bacteria include: Chr. Hansen Viniflora Oenos, Chr. Hansen CH 16, and Chr. Hansen CH35. Yeast nutrients include Fermaid K and Super Food.

Napa Fermentation has Zambelli winemaking equipment including crushers (up to 14 tph), membrane presses, electric hydraulic presses, bladder presses, bottle fillers, auto corkers, pressure-sensitive labelers, plate filters, cooling units, pumps for light must, stainless steel fittings, and cam locks.

Napa Fermentation carries the Tivoli corking/filling machine (AISI-304 stainless steel), with four jaws for use with synthetic or natural corks with 22, 24, or 26mm diameter. Stainless steel fittings, and Karcher hot and cold pressure-washers are available.

For more information, contact:

Napa Fermentation Supplies
575 Third St., Bldg. A
(Inside the Napa Town & Country Fairgrounds)
PO Box 5839, Napa, CA 94581
tel: 707/255-6372; fax: 707/255-6462
e-mail: wineyes@aol.com
website: www.napafermentation.com

PLEASE SEE NAPA FERMENTATION AD, PAGE 90

NADALIE USA

Nadalie USA has provided American, French, and Hungarian oak products since 1980, bringing French know-how and heritage to Napa Valley.

From the tree to the barrel – Nadalie USA's tradition is mastering the whole manufacturing process from tree selection to the final product.

The company has stave mills in the U.S. and France for all American and French oak products. The wood is in the company stave yard for a minimum of two years.

From the same rigorous oak tree selection as its barrels, Nadalie produces Oak Add Ins adjuncts, with more than 20 years of experience in this range of products. Nadalie oak fire-toasts all Oak Add Ins, and offers high-quality adjuncts for winemaking needs.

Nadalie offers fermentation (mixture) and aging products for barrels (cubes, dominoes, oak chains, barrel inserts) and for tanks (tank staves, wine woods). All are available in French or American Oak.

For more information, contact:

Nadalie USA/Tonnellerie Francaise
1401 Tubbs Ln., Calistoga, CA 94515
tel: 707/942-9301; fax: 707/942-5037
e-mail: info@nadalie.com
website: www.nadalie-usa.com

PLEASE SEE NADALIE USA AD, PAGE 22.

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ENARTIS VINQUIRY

Enartis Vinquiry, part of the Esseco Group, offers Enartis fermentation and specialty winemaking products, along with labware and chemicals. Product highlights for 2012:

enartis
VINQUIRY

Enartis Stab Cellogum, available as a liquid or powder, is a carboxymethyl cellulose (CMC) for use in winemaking. After recent TTB approval, CMC is now the technique of choice to stabilize wines by preventing tartrate precipitation. Use of CMC can replace or reduce cold stabilization.

Surlì Vitis Plus is a blend of select grape skin tannins and gum Arabic, developed by Enartis R&D to meet the North American demand for a naturally-derived adjunct for use prior to bottling. It improves sensory characteristics without use of classic fining agents such as gelatin, egg albumin, etc.

Enartis Ferm Primitivo is a yeast strain isolated from Primitivo grapes in the South of Italy. It is recommended for production of Italian varietals and Zinfandel destined for medium to long-term aging. It respects the aromatic profile of the grape and terroir, and increases berry aromas and spicy notes. It is ideal for production of complex and well-structured wines, with an elegant bouquet of cherries and plums.

For more information, contact:

Enartis Vinquiry
Main Branch: 7795 Bell Rd.,
Windsor, CA 95492
tel: 707/838-6312; fax: 707/838-1765
e-mail: info@enartisvinquiry.com
website: www.enartisvinquiry.com
Napa Valley Branch: 1282 Vidovich Ave.,
Ste. C, St. Helena, CA 94574
tel: 707/967-0290
Central Coast Branch: 2717 Aviation Way,
Ste. 100, Santa Maria, CA 93455
tel: 805/922-6321
Paso Robles Branch: 1850 Ramada Dr., Ste. 3,
Paso Robles, CA 93446
tel: 805/591-3321

PLEASE SEE ENARTIS VINQUIRY AD, PAGE 15.

CREATIVE OAK

Creative Oak makes some of the industry's finest oak alternatives, using cutting-edge science and technology to push the boundaries of oak selection and customized toasting profiles. Creative Oak customers are fully supported by an in-house technical services laboratory. Creative Oak pushes the limits of conventional wisdom on the chemistry of oak, heat, and wine to create the tools to make wine with precision, predictability, repeatability, and consistency.

CREATIVE OAK

In addition to GCMS and HPLC machines, Creative Oak has invested in a new Triple Quadrupole GC, which sets a new standard for the detection of trace compounds from complex sample matrices. By using several mass spectrometers in tandem, sensitivity for all compounds analyzed is heightened, and simultaneously sample preparation and run times are shortened. With two GCMS and one HPLC machine, Creative oak's technical services team will optimize sample analysis in the context of sensory evaluation and recommend toasts to develop aromatic "signatures" for wine.

Creative Oak harnesses technology to provide practical solutions to winemakers' needs. Winemakers are assured of achieving desired flavor profiles and repeatable outcomes.

Call for a consultation, either sensory or analytical, and let Creative Oak experts help guide you toward the wine style you seek.

For more information contact:
Creative Oak
Scott Harrop
tel: 707/321-4055
e-mail: sharrop@creativeoak.com
website at www.creativeoak.com

PLEASE SEE CREATIVE OAK AD, PAGE 85.

ETS LABORATORIES

ETS Laboratories has grown and evolved with the wine industry by pursuing a commitment to provide analytical services tailored specifically to the industry's very unique needs.

ETS clients now have the ability to:

- View real-time ETS Laboratories report data, with enhanced search and filtering tools;
- Easily download and print report data and copies of reports and invoices;
- Easily download and view historical data;
- Maintain accounts, including who receives reports and invoices, and by what means.

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ETS Laboratories (St. Helena, CA)
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tel: 707/963-4806; fax: 707/963-1054
e-mail: info@etslabs.com
website: www.etslabs.com
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ETS Laboratories (Walla Walla, WA)
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tel: 509/524-5182; fax: 509/526-8053
e-mail: infowa@etslabs.com

PLEASE SEE ETS LABORATORIES AD, PAGE 45.

PICKERING WINERY SUPPLY

Pickering Winery Supply (PWS) distributes oak adjuncts from Suber-Lefort of Adelaide, Australia, which has 20 years' experience in turning French barrel-quality oak into tank planks, barrel inserts, mini-staves, chips, flakes, and powder. It is the unique toasting regimens and seasoning of the oak that result in flavor profiles quite distinct from any others.

Suber-Lefort produces oak products for fermentation (powder and fine chips), maturation (tank staves, mini-staves, and blocks), and finishing (micro-staves, segments), where aromatics take precedence over tannins.

PWS distributes a special fining agent produced in Germany, Vinpur Special, based on casein. It offers a gentle way to remove astringency, brown pigments, and oxidized phenols in red and white wines. Also, it is often recommended for removal of DMS and green flavors.

What makes Vinpur unique is that it uses cellulose as a carrier, giving the casein a larger surface area and making it disperse much more completely. The result is a powder that can be directly added to a wine and is very predictable, unlike regular casein.

For more information, contact:
Pickering Winery Supply
888 Post St, San Francisco, CA 94109
tel: 415/474-1588; fax: 415/474-1617
e-mail: info@winerystuff.com
website: www.winerystuff.com

PLEASE SEE PICKERING AD, PAGE 92.

Pronektar by Radoux Usa

Pronektar is a complete line of oak alternative products from Tonnellerie Radoux, made from the same oaks that Radoux uses to make fine oak wine barrels. All wood is aged and then convection-toasted to exacting specifications. Available in French and American oak, Pronektar's products are divided into two categories: oak used for fermentation, which includes powder and granulate; and oak used in aging, which includes chips, staves, segments, and stick sets.

A Radoux sales representative is available to consult with winemakers about the benefits of each product.

NEW: DOLCE MOKA, a special blend of heavily toasted chips, gives the wine intense aromatic notes of moka, coffee and toast, as well as a velvety smooth structure. This special blend of chips builds mouthfeel and structure while also preserving the fruitiness of the wine. Dolce Moka preserves the sensorial balance of the wine thanks to an efficient integration following the extraction of the oak compounds by the wine. For best results, Dolce Moka chips use should begin during the malolactic fermentation stage or during aging.

For more information contact:
Radoux USA
Martin McCarthy
480 Aviation Blvd., Santa Rosa, CA 95403
tel: 707/284-2888; fax: 707/284-2894
e-mail: mmccarthy@radoux-usa.com
website: www.radouxcooperage.com

St. Patrick's Of Texas

With 35,000 square feet of equipment, valves, and fittings, St. Patrick's of Texas serves all winemaking needs. Winemaking supplies carried by St. Patrick's include:

- Membrane cartridge filters, and filter housings,
- 40x40 Plate-and-Frames
- 10-inch and 30-inch Cartridge Housings with or without pressure gauges;
- PES cartridges with PP layer, specifically designed for wine filtration
- Refractometers;
- Valves and fittings.

St. Patrick's also offers harvest winemaking equipment, barrel tools, pumps, packaging and bottling equipment. Open 10AM to 4PM Monday through Thursday, and 10AM to 3PM on Fridays. Most products can be ordered online at www.stpats.com.

For more information, please contact:
St. Patrick's of Texas
1828 Fleischer Dr., Austin, TX 78728
tel: 512/989-9727; fax: 512/989-8982
e-mail: stpats@bga.com
website: www.stpats.com

PLEASE SEE ST. PATRICK'S OF TEXAS AD, PAGE 96.

Scott Laboratories Inc.

Scott Labs offers several new products in 2012, including two new yeast strains from the yeast hybridization program at the University of Stellenbosch in South Africa. Vitilevure Elixir is a *Saccharomyces cerevisiae* hybrid noted for its ability to express terpenes, norisoprenoids, and thiols. Exotics SPH is a specialty yeast strain hybrid from *S. cerevisiae* and *S. paradoxus*. It provides expanded aromatic potential beyond what pure *S. cerevisiae* alone can offer.

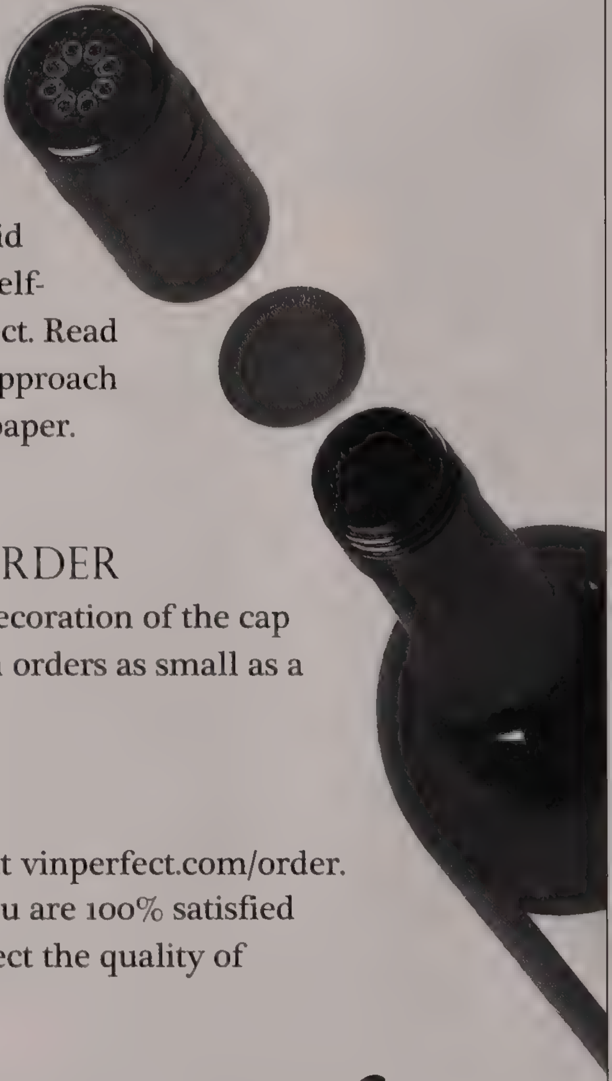
Fermaid A is a complex yeast nutrient that encourages a more balanced rate of fermentation, and Scott Labs has added Lallzyme MMX, an enzyme to improve the filterability of *Botrytis*-infected wines, and Scott'Tan FT ColorMax, a fermentation tannin to achieve color stability in red and fruit wines.

In its ongoing efforts to provide customers with increased options, Scott Labs has added new sizes to existing products – OptiMUM WHITE, Fermaid O, Opti-WHITE and Caseine Soluble. The list of OMRI certified organic products continues to grow with the addition of Nutrient Vit End, an inactivated yeast product for sluggish or stuck fermentations.

In addition to the Petaluma office, Scott Labs has a satellite location at 190 Foss Creek Circle, Suite G, in Healdsburg, CA for convenient pick-up of fermentation and filtration products.

For more information, please contact:
Scott Laboratories, Inc.
PO Box 4559, Petaluma, CA 94955
tel: 707/765-6666; fax: 707/765-6674
e-mail: info@scottlab.com
website: www.scottlab.com

PLEASE SEE SCOTT LABS AD, PAGE 74.



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VinPerfect high-performance screw cap liners allow consistent, discrete amounts of oxygen into the wine bottle over time, assuring optimal aging. We help ensure the wine your customer opens is defect-free and drinks as you intended.

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PRICE, PRODUCT, PLACEMENT, PROMOTION:

Does your label help you stand out from the crowd?

BY Paul Wagner, Balzac Communications

Classical marketing theory teaches us that the perception of your brand is based on four key elements: Price, product, placement, and promotion. There is no reason to believe that the value of wine brands is any different. But there is some reason to believe that a lot of wine companies do not see it that way.

Let's examine these one by one:

PRODUCT

PRODUCT: Most wineries want to talk about product as if it were the be-all and end-all of the question. It is not. I would point out that in 2011 almost 5,000 wines were rated at 90 points or better by major wine publications.

Conclusion? If you make good wine: congratulations. You are now one of 5,000 brands vying for attention in the marketplace. That is better than being one of 100,000 (the number of wine SKUS in the market) but it does not exactly make you stand out from the crowd. The goal of marketing is to make you and your brand stand out from the crowd.

PRICE

PRICE: You already know where this one is going. The key price point for success in the U.S. market is between $7 and $25 per bottle on the retail shelf. You know perfectly well that the competition there is overwhelming. Trying to stand out? Price will not do it. When you look at your competition, they are all at the same price point, by definition.

Conclusion? While any sommelier will tell you that raising your price will increase your sales, every distributor will tell you exactly the opposite. Price your wines fairly for what they cost, and at least you will not be losing money!

PLACEMENT

PLACEMENT: For most of the wines in these basic price categories, the placements are going to be the same. They are going to fight for shelf space in retail shops, and struggle to get placed on restaurant wine lists.

Conclusion? Since all the wines are competing for these same spots, by definition their placement will not distinguish them from the competition.

PROMOTION

PROMOTION: Take it from someone who does it for a living, most wineries do not have the kind of budget to do large scale promotions to affect the brand. A tasting here, a winemaker dinner there, and maybe a donation to a local charity for a few months?

Conclusion? Those are not going to move the needle.

That brings us to the single biggest interface between winery and consumer; your label. It is your brand package, your ambassador to the public, and your company spokesperson, all in one. How do you know if you have a good label?

I suggest that there are several ways to look at this:

1 Does it stand out on a shelf? Most wines these days need to have some success on a retail shelf – and that does not mean being hand-sold by the shop owner. It means that the wine has to attract customers and close the sale all by itself.

Does your wine label stand out enough to get noticed amid a sea of competitive labels? Most do not. Is that critical for success? Not always (certainly Chateau Lafite-Rothschild's label is discreet and elegant, but it would be lost on today's supermarket shelves – and yet the brand is successful for those other reasons noted above.) But if you are a new winery starting from scratch, you do need to get noticed.

2 **Does it add value to the product?** One of the highest compliments that you can give to a designer is to tell him that the wine tastes good – like a $12 wine. With the label on the outside of the bottle, it now tastes like a $15 wine. That is value for your design!

In this case, the label is very much like that batch of cookies you bake just before hosting an open house for the home you hope to sell. No, the house will not always smell like fresh baked cookies, but at least it gives the potential buyers a sense of what would be possible. Mmmm.

3 **Does it capture the essence of the brand?** Your brand is nothing more than a promise that you are making to your customers. The label should convey that promise in a way that allows your product to deliver it. Here we get at one of the real challenges of wine marketing. Every winery wants to make the promise that their wine is ALMOST as good as Chateau Lafite-Rothschild, and does not cost so much. If you are looking for a point of differentiation for your brand, this sure is not it.

Like those dreary wine ads in magazines (the ones with your bottle in a still life with beautiful stemware, a nice piece of cheese, and crusty loaf of bread), they do nothing to tell the consumer what makes your wine different. In fact, all too often they tell consumers that you wine is just like everybody else's. That is not a good message to send.

That third element is really important. Because most wineries do not do a very good job of defining their brand in terms of product, price, promotion, and placement. Then they create a label that looks like all the other labels. Then they wonder why people do not notice their wines, or remember their brand?

That's why.

One last thought about this topic. People in the wine business spend hours, weeks, and even years thinking about the label they are putting on their bottle. That is good. They should.

But all too often, they worry about the wrong things; the width of the keyline around the logo, the depth of the debossing on the varietal name, the percentage of recycled materials in the paper. Yes, a good designer will think about these – you should take his/her advice.

But the bigger picture does not get the same kind of attention and concern. Because what you should really be asking is:

Does this label make a promise to my customer that they find attractive?

Is that promise clear and easy to understand?

Does the product deliver on that promise?

Will this be obvious to a consumer who does not spend a lot of time thinking about it?

That last one is the kicker. Because for all the time we spend we spend designing the package, the average consumer spends less than 15 seconds deciding on a bottle of wine. If what you are doing on the label depends on a careful and comprehensive study of every element, then chances are that consumers are not going to give you that opportunity.

Consumers are going to choose the wine that expresses their desires very clearly and quickly. They are going to choose wines with labels that clearly show what is in the bottle, and why that is different from what is in the other bottles. ■

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BRASSFIELD ESTATE

Wine labels survive the ice bucket test

BY Tina Vierra

Brassfield Estate Winery in Lake County, California has found 100% post-consumer-waste label paper that makes them happy.

Brassfield currently bottles about 30,000 cases of wine per year. Carrying forward the original rancher's practices, and with no municipal water source on which to rely, the estate runs on its own resources, farming and ranching, fostering and protecting its land and waterways with pragmatic sustainability in mind.

Simon Whetzel, operations manager for Brassfield, can share chapter and verse on their attempts at packaging, but especially about the efforts to design and print a label with the look the winery wants, the right paper texture, and which does not fall apart or deteriorate with normal use.

"With all of our prior labels, including a design we started using three years ago, we used a common paper stock, the 'estate 8' paper," Whetzel reports. "Every one of the labels failed to meet our standards. We tried four different printers over a period of seven years, to get it right."

The biggest challenge to Brassfield's labels is a common one – when a bottle of white wine experiences condensation at the table, or is immersed in an ice bucket, the label paper (creamy white for the Brassfield label) would turn a sickly grey and deteriorate. The adhesive would fail, and the label would begin to drift on the bottle, or come off the bottle altogether.

"When G3 Enterprises came to us, they were one of the first companies to offer a label paper that overcomes this problem," Whetzel reports. "Their GTREE label stock has a combination of 100% post-consumer-waste (PCW) paper, and a specially developed pressure-sensitive adhesive, AND an under"Our label is simple in appearance, but in details, it is more complicated than it looks. In the past, we had always used textured paper. GTREE is not a textured paper, but in the printing, G3 was able to lay down ink to give us the textured look we wanted. We obtained a more economical, greener

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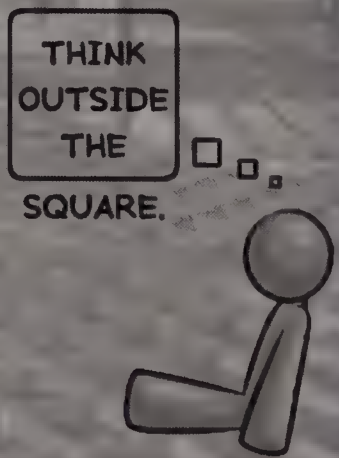
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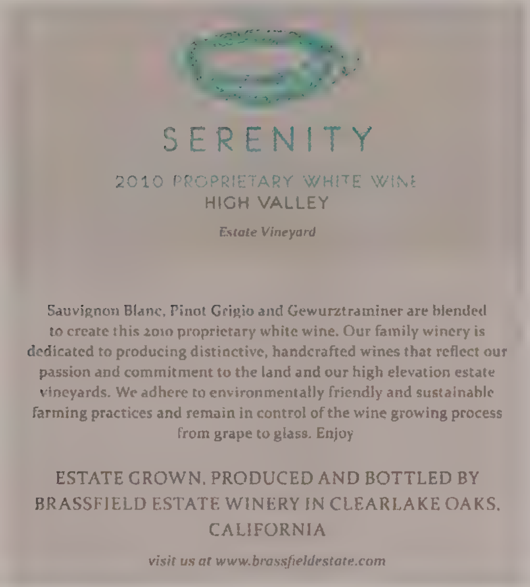
Fred Dale, a senior manager in label quality and technology for G3, says the paper itself, made for G3 by Monadnock Paper Mill, is resistant to water damage through a proprietary manufacturing process co-owned by the companies.

"Scuff protection in this label, and the high-build ink impression that looks 'textured,' are achieved on uncoated GTREE paper stock using a rotary screen printing process, followed by an ultra-violet varnish," Dale reports.

The closure on the white wines is screwcap, and on the red wines, natural cork. On the Pinot Noir, the winery applied polylam instead of its usual tin capsule as a test, though other 2012 red wine bottlings will receive tin capsules. The winery had no bottling line issues or adjustments to make for the new labels.



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In January 2012, Brassfield bottled its signature red wine blend, the 2010 Eruption, with labels printed on the new GTREE label stock. After the sellout of the 2009 vintage of Eruption, the winery doubled production of the 2010 vintage, which is becoming one of their more successful wines.

In March 2012, the signature white wine blend, 2011 Serenity, was bottled with the new labels.

Brassfield sells wine in about 26 national markets, with California, Illinois, Washington state, New York, and Florida being the most mature for the winery. "We had sales team orientation with the new labels and vintages in early 2012, and everyone could tell the paper was very different. They are all excited about the quality and the staying power of the new labels," Whetzel adds. ■

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SWANSON VINEYARDS

Upscale wine features simple, approachable design

BY Paula Sugarman
Sugarman Design Group, Fair Oaks, CA

Buying wine can be an intimidating experience. Some wineries promote a lofty image, which sells to those who know a lot about witne. But at Swanson Vineyards (Napa, CA), whose wines range in price from $21 per bottle to $140, they are about having fun and celebrating life, no matter what the price point. Here is how they do it:

All Swanson bottle designs are predominantly white, and are directly printed on the bottle or on a clear label. They cast away the concept of etched chateaus on heritage paper for a simple, clean, and whimsical style that translates to all of their wines. The results are a brand personality that is fresh, fun, and unintimidating. It seems to be purposefully unsophisticated, yet most of the wines are high-end.

The current logo for the Swanson core wines is an iconic line drawing of a lady who looks like a flapper from the 1920s. She is a gadfly, on the go, having a good time. The original Swanson Vineyards logo was designed by John Blackburn in 1986. He played with many ideas, including two swans swimming (swan and son), two s's with a water ripple, and a hand-drawn picture of a swan's egg (a Swan's son; Blackburn thought it would be eye-catching on a retail wine shelf).

While attending an opera, Blackburn noticed a poster of Jean Cocteau's Le Testament d'Orphée. He was inspired to incorporate the concept of Mr. Cocteau's profile with a swan and the Swanson logo was born. Twenty years later, Alexis Swanson Traina collaborated with Blackburn to refresh the brand. They reworked the logo by softening the profile/swan and updating the logotype for a more contemporary look. The original label was printed on paper. With the 2005 vintage, they changed to screen-printing for a sleeker look. It cost a little more to print directly on the bottle, but the results were a cleaner and simpler design that better fit their brand.

At the other end of the Swanson spectrum is Angelica, a wine sold only in the tasting room. Only 30 cases per year are bottled (at $140 per bottle). The word Angelica is handwritten in a casual, even playful style that fits with the Swanson brand personality. The clear glass and exquisitely simple bottle shape, topped off with a wax seal, communicate the richness of the product. In design, less is more, but every element needs to be perfect. Angelica, a fortified dessert wine created from Mission grapes grown in the Sierra Foothills, is a great example.

SWANSON
VINEYARDS

In 2010, Swanson Vineyards launched the Modern House Wines ($25 per bottle). The concept is a red wine for every occasion, designed so simply that you need only read the name on the bottle and you know what to do. If you are in a quandary for a gift, there is bound to be a solution here that will make you look smart, classy, clever, and always appropriate.

Modern House Wines is a great marketing concept that rounded out the Swanson portfolio and is mostly purchased by women. By contrast, the Swanson brand wines (Cabernet Sauvignon, Chardonnay, Merlot, Petite Sirah, Pinot Grigio, Rosato, Sangiovese, Sauvignon Blanc, and Viognier) are mostly purchased by men.

Many may know the Swanson name for the frozen, prepared food company W. Clarke Swanson's grandfather created in the early 1950s, then sold to the Campbell's Soup Company in 1955. In 1985, W. Clarke Swanson returned to his family's agricultural roots, and purchased a small vineyard in the Oakville appellation. Swanson is one of the pioneers to produce Merlot as a "standalone" variety. Prior to that, Merlot was mostly used in blends to soften more tannic varieties. Their portfolio has grown to include a broad variety of wines.

Paula Sugarman is the owner and creative director of Sugarman Design Group, a full-service graphic design firm specializing in branding and package design for the food and wine industries: sugarmandesigngroup.com. She also writes the blog: winelabelsthatwork.com.

In a quirky way, the mission of both companies is connected. With TV dinners, Swanson Foods introduced an easier way of life for families. (I remember TV dinners as a special treat at my house.) Swanson took the convenience of frozen food and connected it to the television, the newest, hottest enhanced lifestyle activity. That is marketing at its best. Similarly, the Swanson Vineyards mission is "to celebrate the simple pleasures in life, made better with wine."

The Swansons have successfully created a brand that is welcoming to all. Winemaker Chris Phelps is highly accomplished and talented and all of the Swanson designers and artists are internationally known for their work. The artist who created the website illustrations is Jean-Philippe Delhomme, illustrator for such clients as Bon Marché in Paris, Barneys in New York, and other various well-known curators of lifestyle. Creative partners in the Sip Shoppe (Swanson's tasting room) are Andy Spade and world-class interior designer Thomas Britt. The tasting room is by appointment only.

Creative Director Alexis Swanson Traina sums it up most aptly: "We take our wines very seriously and passionately believe in glorifying everyday rituals, every way we can." ■

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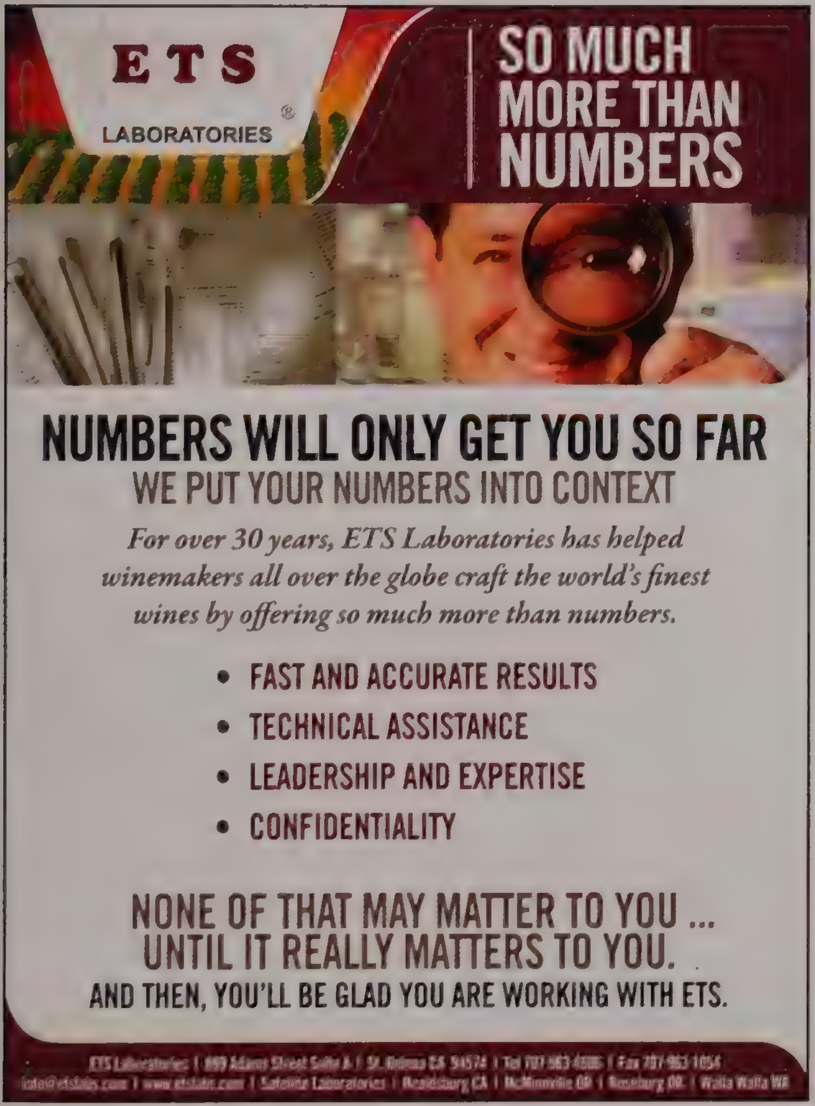
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ECONOMICAL SMALL QUANTITIES

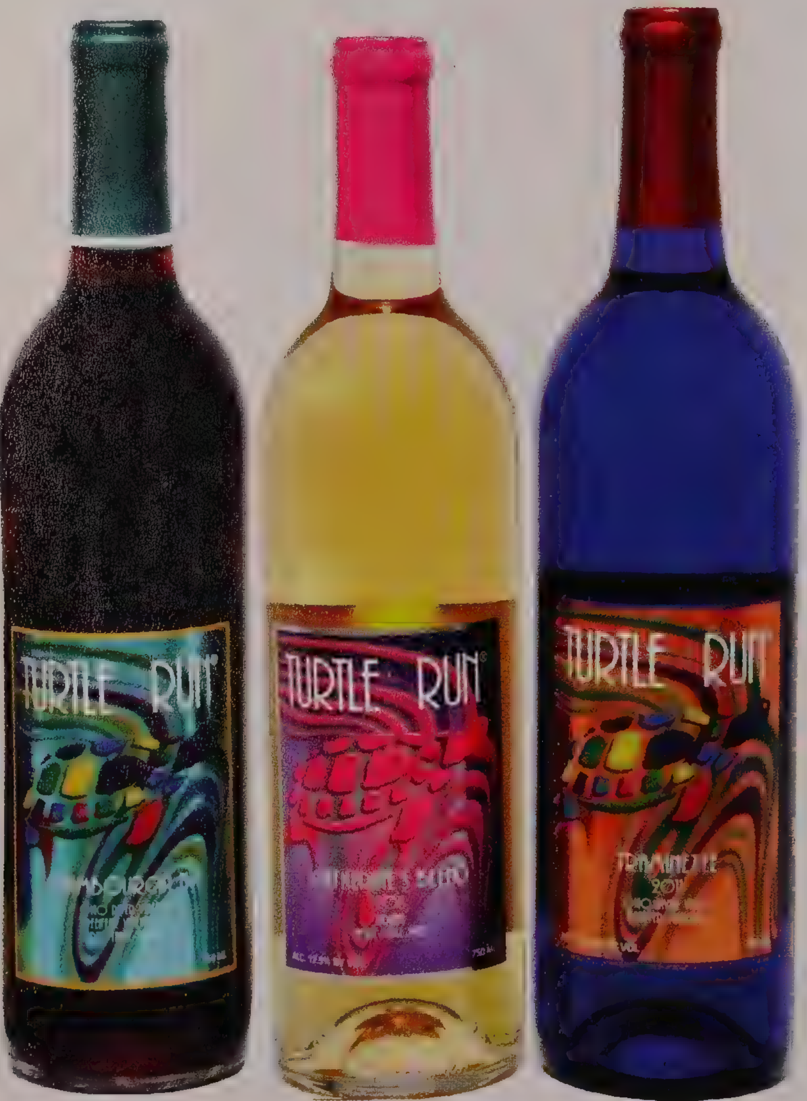
New print process creates *striking* wine labels

BY Dennis Mason

Talk to Jim Pfeiffer for 15 minutes, and the term *Renaissance Man* comes to mind. Talk to him for 30 minutes, and you will probably hear the word *terroir*. Pfeiffer, with his wife Laura, is the brains behind Turtle Run Winery, located in southern Indiana near the Ohio River.

The dream begins

For the Pfeiffers, Turtle Run Winery is the realization of a dream that began in 1993. Pfeiffer finished his college education, where he took an eclectic variety of courses, including business, marketing, finance, computer science, physics, botany, and geography. He found the geography and botany courses particularly intriguing and began to explore the world of wine and where it is grown. The synergy of his college courses set Pfeiffer on a course to find the ideal location in the U.S. for viniculture – taking into consideration climate, soil, altitude, and myriad other factors.



"We saw that the wine industry was highly fragmented," says Pfeiffer, "and we believed that we could create value by selecting the ideal location for producing quality wines. A winery would give us the opportunity to meld science and marketing in a business of our own." After a four-year search, Pfeiffer purchased a farm near Corydon, Indiana, and planted his first vines in 1998.

"*Terroir* – a French word with no precise English equivalent – drove my search. The term embodies all the agrarian and climatological factors that produce good wine grapes, and I found the 'perfect storm' of these factors at what is now Turtle Run Winery."

Open for business

An eager, passionate believer in the science involved, Pfeiffer was even able to convince a local banker that his scheme would produce profits in an area virtually unknown for growing grapes and making wine. The Pfeiffers harvested their first grapes in 2000, and opened their winery to the public early in 2001.

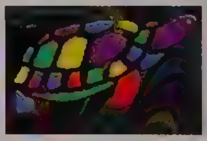
"The area near Corydon, Indiana, is quite similar to that in the Burgundy area of France," adds Pfeiffer. "Our limestone and clay is unlike that anywhere else in North America. Our perfect limestone permits water and minerals to flow to the vines, and that enables us to grow grapes that are complex and to produce award-winning wines. In the wine business, site selection is incredibly important.

"Although many people regard France as one vast vineyard, in fact only 5% of the land is actually suitable to grow wine grapes for which the entire country is known. In addition to the right soil, factors for success in wine include weather, altitude – even the slope of the vineyard toward the sun."

Today, Turtle Run Winery is gaining recognition in southern Indiana, and others, noticing the Pfeiffers' success, are developing wineries in the area. Turtle Run Winery has seen visitors from many states. Weekends at the winery attract musicians and wine lovers, and Pfeiffer conducts wine classes teaching the subtleties of tasting and pairing with foods. But to sustain his success, Pfeiffer needs broad distribu-

Continued on page 48

TURTLE RUN WINERY



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Turtle Run Winery

Continued from page 46

tion. Marketing Turtle Run wines on a broader scale is critical.

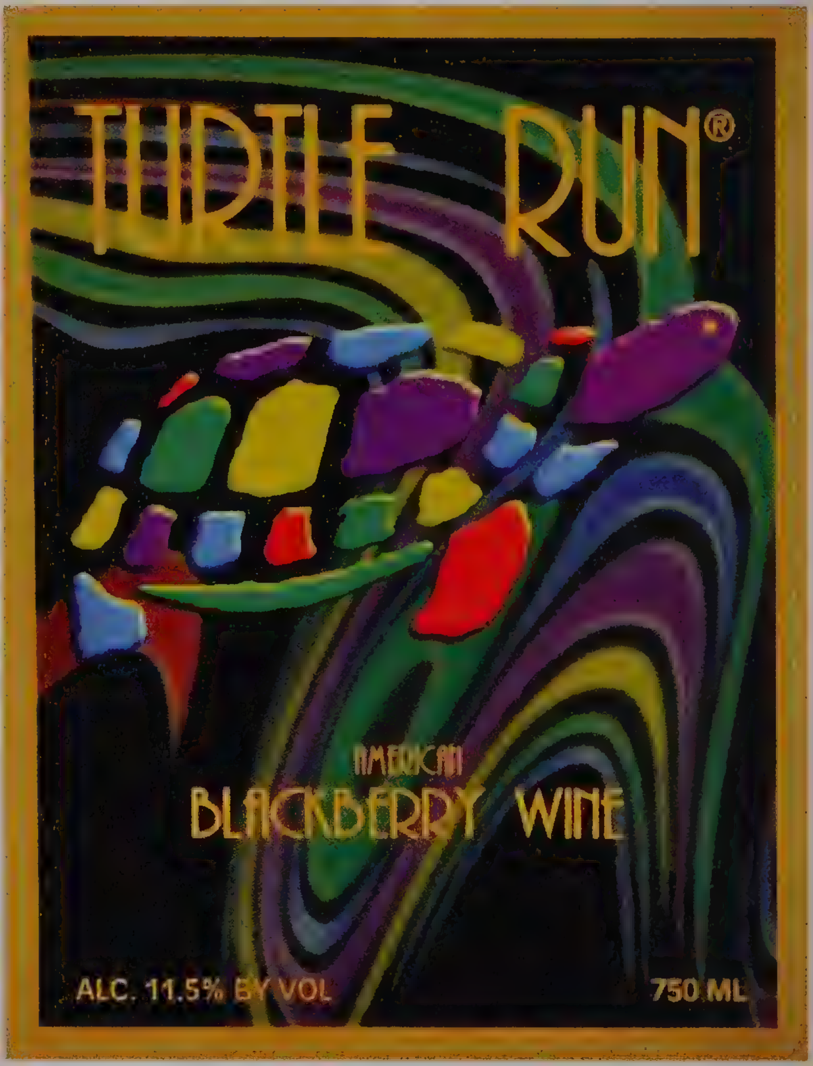
Creating the brand

Successful distribution in the ultra-competitive wine market necessitates gaining shelf space in many wine shops and liquor stores. "Both distributors and wine shop owners know that attractive labels are the first step in getting consumers to try a new wine," adds Pfeiffer. "Subsequent sales of the brand – and thus market share – are driven by consumers who return to the store and can readily identify the label and wine that they enjoyed."

When Turtle Run wines first began to get distribution, Pfeiffer commissioned a label he felt would be strikingly attractive and would prompt ongoing sales of his wines. The prominent stylized turtle on the label evoked the name of the winery, and the idea of a running turtle was whimsical enough to cause consumers to recall the wine.

"Although the label began to receive recognition in the marketplace, I was never quite content with it," recalls Pfeiffer. "I wanted the turtle to literally pop off the label. We experimented with foil and metallic ink, but nothing produced the effect I wanted. I found it difficult to explain to graphic designers what I wanted, and they had trouble executing.

"Then our label printer invited me to attend a package print forum. I heard a presentation by Color-Logic about a new graphic design software program specifically created to provide enhanced effects with metallic printing. In discussing the graphic design software in greater detail with the printer, we thought it was just the ticket to help my labels achieve their full potential.



"I purchased a seat for the Process Metallic Color System software program from Color-Logic in 2011 and gave it to my graphic designer. The label design created with the system produced the effect I had been trying to achieve, and after 11 years of frustration, I finally obtained the look I wanted. Customers who see it in the wine shop love the new labels, as do those who visit the winery and buy from us direct."

"Brand and product managers are rapidly adopting the Color-Logic process to differentiate their products from competitors in the marketplace," says Color-Logic Director of Sales and Marketing Mark Geeves. "The superb metallic special effects enable brands to truly stand out on store shelves."

Production process

Turtle Run pressure-sensitive labels were printed by Innovative Label Solutions (ILS) of Hamilton, Ohio. ILS – a licensed and certified Color-Logic printer – produced the labels on an HP Indigo digital printing press, using four-color (CMYK) inks plus white ink layers on a silver metallic substrate.

"The metallic effect is not from ink, but the substrate shining through," explains Kathy Popovich, Director of Marketing for ILS. "It is definitely not metal decoration in the conventional sense (hot or cold foil). Where the metallic look is not required, white ink is laid down as a background for the CMYK inks. Moreover, by screening the CMYK inks, and providing patterns within the white layers, more than 250 different metallic hues may be created with just five inks.

"The Color-Logic process is a perfect match with the digital printing platform. Digital printing involves perfect registration and the ability to create intricate design elements because there are no plates and no trapping. Vignettes and screens reproduce beautifully. This is paramount for the Turtle Run labels.

"Because digital printing is economical even for very small minimum quantities, Jim Pfeiffer can submit an order to ILS Labels to include from four to ten different wines on one press run, with a different quantity for each wine label. Doing this, he can better manage his inventory by buying only the labels he needs, and still keep his costs well below what he was paying previously."

California, here we come!

Color-Logic fits neatly into Pfeiffer's plans for marketing his wines and expanding distribution across the Midwest. "Building a brand is always incredibly difficult for a small winery — particularly so for one located in an area not widely known for producing quality wines," says Pfeiffer. "As a result, many small wineries add sugar, producing unbalanced sweet wines often found outside California. At Turtle Run Winery, we add no sugar, relying on our unique combination of soil and climate to produce wines that not only do not need sugar, but stand out without it.

"Applying terroir to the process and putting our wine in an attractive package that stays in the consumer's mind is what makes Turtle Run Winery successful in a very competitive market. Color-Logic enables us to truly make our labels sparkle. We are already looking for ways to continue leveraging digital printing with some of the other features of the software to further build our brand. After all, our goal is to gain distribution throughout the U.S., including Napa, California." ■

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BY Stacey Divine,
Infuze Marketing, Sacramento, CA

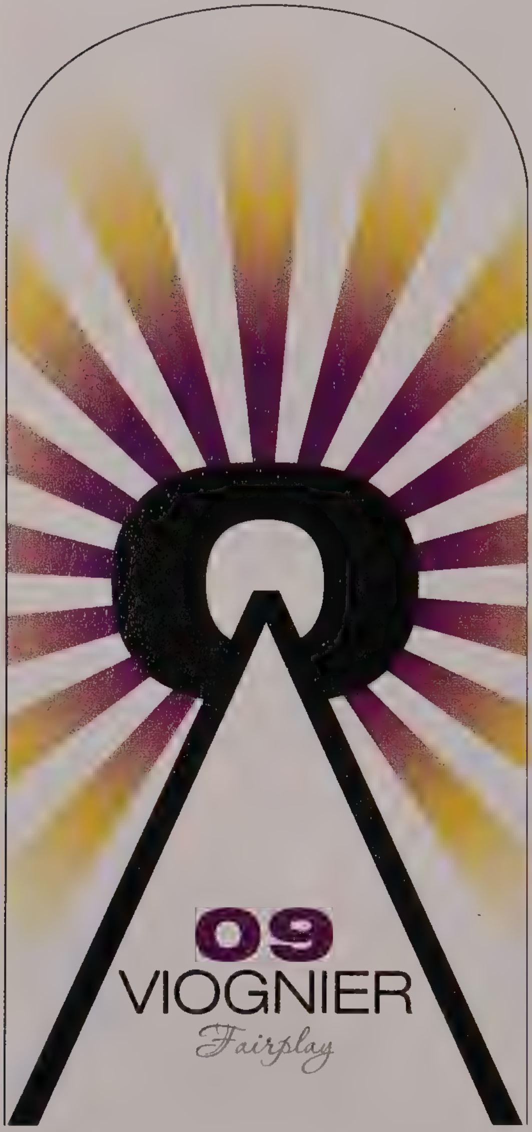
When Michel and Terrie Prod'hon purchased Mount Aukum Winery from the previous owners, they inherited a logo/label that needed improvement. Terrie came to Infuze Marketing with a desire to revamp their brand (and thus, labels) to have it better represent who they truly are as people, winemakers, and a family-owned and operated business.

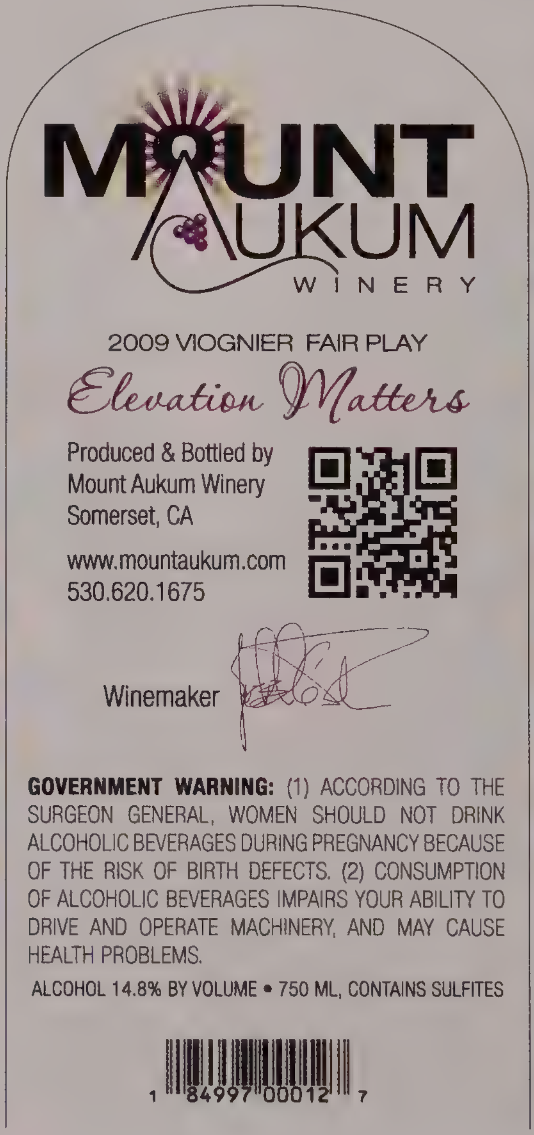
After numerous meetings to dig deep into what their wines are all about, a creative brief was developed for their new labels. It incorporated the Prod'hons' appreciation of clean lines, vibrant color, and a welcoming family feel. The labels also highlight wines that take advantage of their excellent soil, and how they create multiple blends with under-utilized varieties (such as Viognier), wrapping it all up to highlight the vibrant energy of the wine and the Prod'hons themselves.

The winery owners shared that they wanted something to "stand out" visually, just as they wanted their wines to be recognized for their quality. Michel and Terrie wanted people to know that they offered more than just wine – they share an "experience" of the wine world from start to finish. They wanted to open up their target market to a wide age range, from 25 to 75.

A staggering view from the winery in El Dorado County (northeast of Sacramento, CA), supports their tagline of "elevation matters," not just because of the physical elevation (2,615 feet), but also because of the quality of service and taste of wines being "elevated" to more than standard. The design challenge was to create an identity and label that was "elevated" also, through optimum use of color, shape, form, and creativity.

Michel and Terrie offered a number of adjectives to describe what they wanted people to feel when seeing their new identity, including: vibrant, edgy, inviting, unique, versatile, family-owned, and friendly. As in any family, there are many diverse aspects to each person's (and wine's) identity. The goal was to achieve that same sense through the outcome of the final design chosen by the client. The color and shapes representing the blast of light and energy from their

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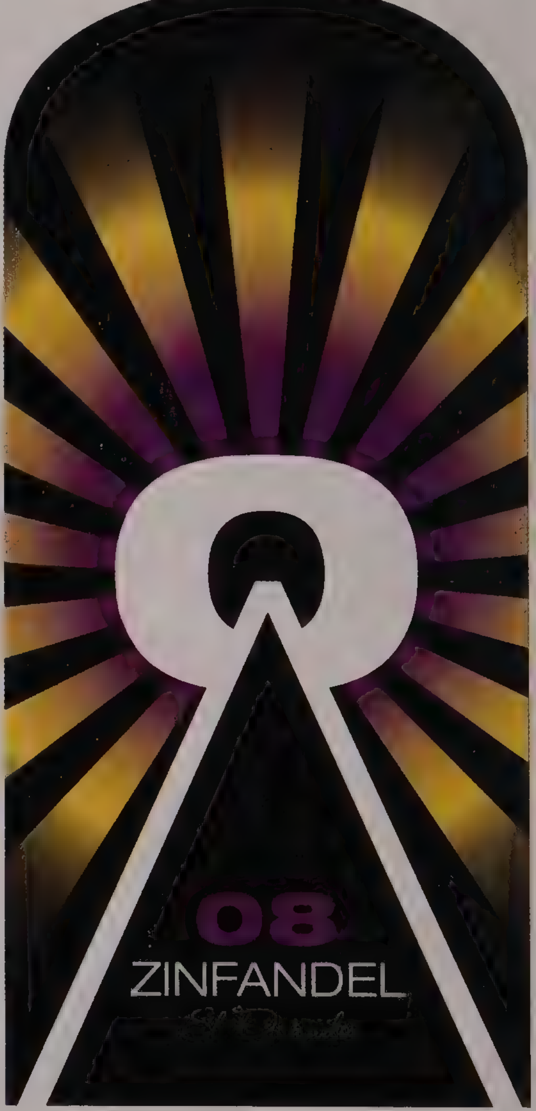

winery's elevation and their own personalities snap the consumer to attention.

Multiple design schemes were submitted to the client, varying from conservative to cutting-edge. For the chosen design, the creative director and designer pulled from the winery's mountaintop setting the reflecting colors of the sky in its most active form. Recognizing that multiple labels side-by-side in a retail environment can be confusing and overwhelming, the designer's goal was to create something significant that would be visually recognizable immediately, causing it to stand out in a sea of off-white, gold-foil landscape images with script fonts.

This was achieved not only through the shape of the icon referencing sunbursts and the mountain peak generated by the "A" in Aukum, but also by the oversized "o" that supports the sense of awe-inspiring views experienced from the mountaintop tasting room at Mount Aukum.

The color scheme used in white wine labels comes from wanting to create an instant emotion of "fresh, crisp, light" and the feeling on a summer day of wanting a glass instantly.

The color scheme chosen for red wine labels evokes rich, bold, desirable wines with a hint of mystique — inviting the consumer to want to linger in the moment.

Three different variations of color were used for an annual production of 5,000 cases of red, white, and dessert wines because, although like family, they are all closely unified emotionally, they have incredibly different personalities and identities.

We were honored to meet the challenge and have the Prod'hons be so thrilled by the unique fresh label they now use for the new Mount Aukum Winery. ■

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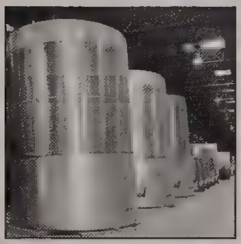
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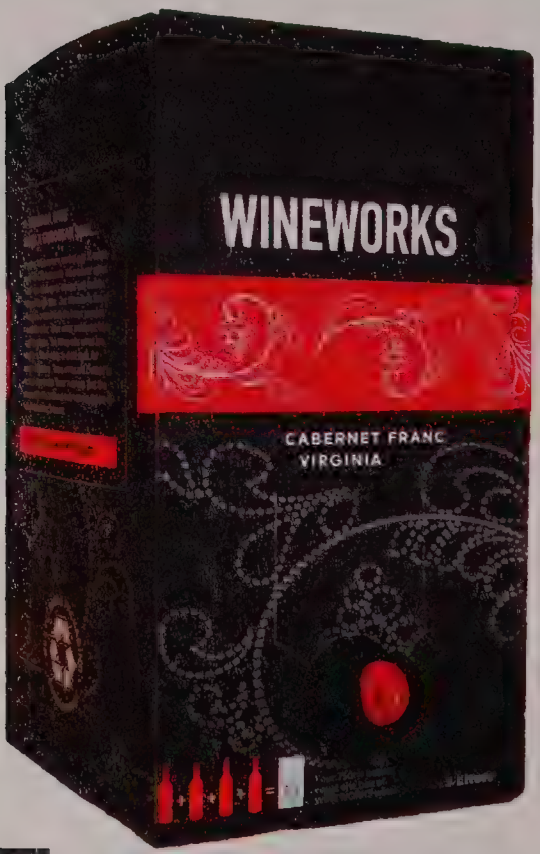


BY
Darcey Ohlin-Lacy,
Watermark Design, Charlottesville, VA

Virginia Wineworks wines (Charlottesville, VA), were created by Michael Shaps and Phillip Stafford to meet a need for value-oriented Virginia wine. They work with quality grape growers throughout the state of Virginia to find the best possible fruit to make fun, approachable wines. "We work to create wines that maintain high standards of quality at reasonable prices ($12 to $16), we do not look to over-run the natural fruit notes with either oak or over-extraction from fermentation or aging."

These wines were originally sold only in bottles, but three wines (Chardonnay, Cabernet Franc, and Viognier), were later also packaged in Bag-In-Box (BIB) to further the consumer-friendly approach (allowing shelf life up to two months) and for a reduced environmental impact.

Design challenge

The original design for the Virginia Wineworks brand was very masculine and included two burly male winemakers tasting over a barrel. Statistically, women buy the majority of wine in the U.S., and this approach was not appealing to the masses on the retail shelf. The Winework's distributor approached Shaps and suggested a redesign to boost sales.

In turn, Virginia Wineworks approached Watermark Design, a local design firm, to create a solution to appeal to women but not alienate men altogether. BIB was new for Virginia wine and the box had challenges. The design included tight registration, not as easy to print on cardboard. Over the last three vintages, efforts were made to adjust overprint issues.

Design solution

By keeping the black, yellow, and red inherent in the original design, but losing the burly men, the brand kept its bold, casual feel but opened up its appeal. The vibrant color band is hard to miss on-shelf but is softened by an illustrative overlay (on top of the color band) graphic pattern that appeals to female consumers. The black background and sharp, san serif type fonts ensure that the design does not dip too far toward feminine.

The label design was then applied to the box design, with additional graphics indicating its environmentally-friendly attributes along with the wine's origins, and indicating the length of freshness (large 2 on back with text explaining that the wine stays fresh for up to 2 months after opening), and the number of bottles available in a single box (shown as four bottle images equal one box).

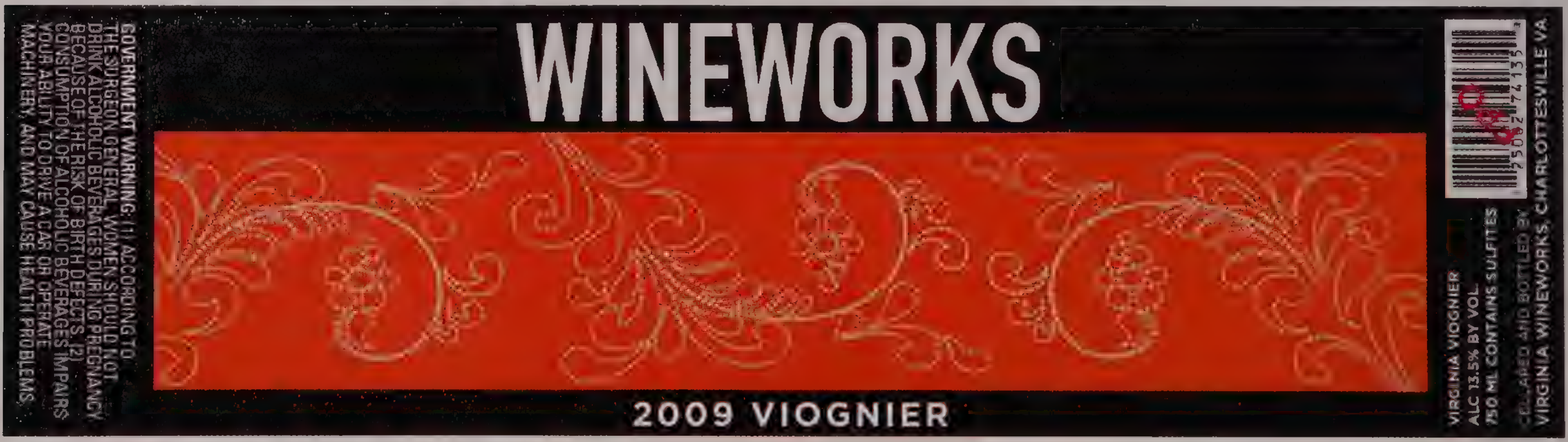
Bag-in-box success

The BIB evolution of this brand came when Shaps visited France and Germany and noticed this trend already taking root, as those cultures are also very environmentally-conscious. They enjoy fresh, local wine for daily consumption.

The Virginia Wineworks Bag-in-Box wine is served in 32 restaurants. Why? They are able to store and keep the wine for much longer periods of time – for up to two months after opening – making sales by-the-glass a more cost-effective option, reducing waste. The restaurants range from high-end fine dining to a new restaurant in Arlington that serves whole communal tables with BIB wines at $60 (3 liters).

A few of these restaurants have both the box and the bottle in case guests want a bottle of the same wine. Virginia Wineworks is working on a carafe offer to restaurants to encourage a 10-ounce carafe (a half-bottle or about a two-glass serving).

The BIB option is also great for price-conscious consumers who want to get more bang for their buck. There are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nearly four bottles of wine in every Virginia Wineworks box. If you do the math, an average bottle ranges from $12-16 but the average box is $30, a savings of about $20.

In today's market, this redesign and the BIB approach has proven to be a 1-2 punch with sales rivaling production limits. Virginia Wineworks BIB sales increased 20% after the redesign. We look forward to the next evolution of Virginia Wineworks.

Virginia Wineworks has used their BIB filler about a dozen times in the last 18 months. They fill about 2,500 liters each time, which allows them to package enough for several months of sales. They are still new at this and are learning the volumes that are required to keep up with demand. Sales of the three BIB wines are growing steadily, so they are trying to forecast production needs, but it is difficult due to the fast pace at which it is developing. ■

WINE FACTS

Alcohol 13% by volume

Chardonnay – One-half of the blend is stainless steel tank fermented and aged for a light, fresh style. Barrel-fermented and aged wine is blended in for a hint of oak and weight. The Muscat clone of Chardonnay is a perfect fit for this style.

Cabernet Franc – Made in a young, approachable style, with minimum skin contact and tannin extraction. Matured in older oak to retain bright fruit character and soft tannins.

Viognier – Stainless steel fermented and aged. Bagged in January, four months after harvest. 85% varietal with Vidal Blanc and Petit Manseng in the blend. Less than 1% residual sugar, but a consumer-friendly style with bright acidity.

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MODERN, YET ELEGANT LABELS ACHIEVE DIFFERENTIATION

BY **Holly Jensky**

Caliza Winery, a boutique, family-owned winery (Paso Robles, CA), specializes in small lots of quality Rhône-style wines. The winery produces hand-crafted varieties that are bold, yet elegant, including red, white, and rosé that drink well today or in the future.

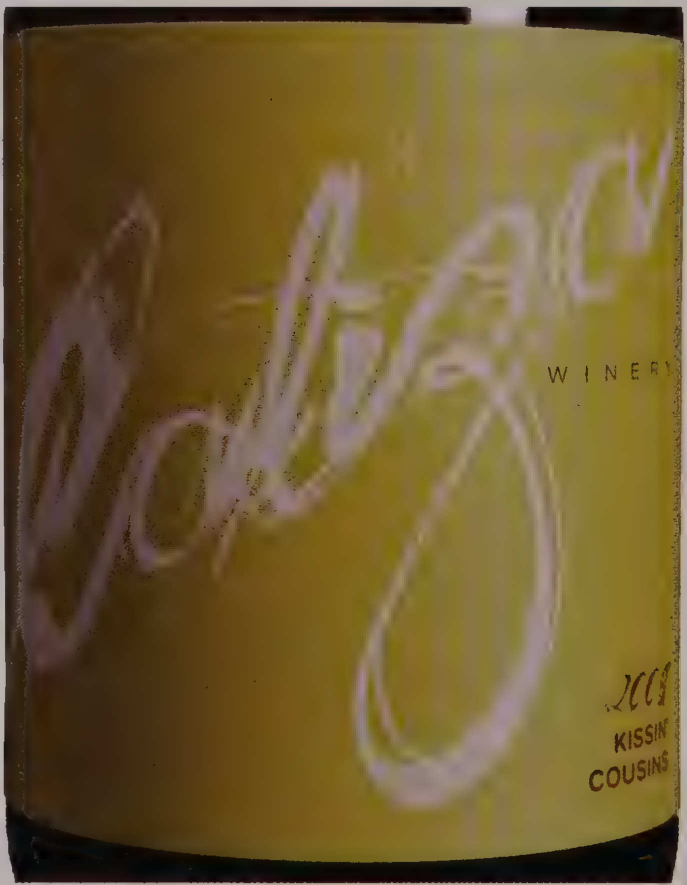
According to the report A Signature California Industry: California Wine by the Wine Institute, California is America's top wine producer, making 90% of all U.S. wines. In January 2012 California had 3, 519 wineries, predominantly family-owned.

It is in such a competitive marketplace, Carl and Pam Bowker, owners of Caliza Winery, knew the importance of having an exceptional label when launching their brand in November 2008. This market environment is all the more challenging for Caliza, which is a limited-production wine producer. The majority of Caliza wine is sold directly through the winery tasting room. It is also available for purchase at select specialty wine retailers and upscale restaurants, and online at www.CalizaWinery.com.

To establish their wine as a premium brand, the Bowkers wanted a label that combined visual intrigue with a strong tactile feel, to create a high level of differentiation. Looking to capture consumer attention on the shelf, the winery engaged Redbarn Marketing (Paso Robles, CA), a marketing communications company specializing in the wine industry, to design the label.

"Caliza Winery came to Redbarn Marketing with the intent to stand out in a sea of uniformity," says Scot Burns, owner of Redbarn Marketing. "We presented Caliza with five creative concepts that encapsulated six main objectives:

- communicate confidence in the product,
- make a statement about the end-user,
- be slightly irreverent to the conservative wine 'establishment,'
- have a sexiness about the brand,
- reflect the artisanal qualities of the wine, and
- be all about the wine in the bottle and not about possessions, such as the winery grounds, etc."



Wanting to depict the free spirit of the winery owners, along with the artisanal qualities of the wine, Redbarn Marketing designed the label to feature the word "Caliza," which is Spanish for limestone – a sedimentary rock found in the soils in which the vineyard is planted – handwritten in a scribbled fashion. The text looks as if it were done very quickly with a broken feather quill-tip pen.

In the hope of capturing consumer attention and getting them to focus on the label, the text was purposely designed to be hard to read. In addition, a heavy debossing technique was used on the Caliza brand signature.

"We used calligraphy to reflect elegance and give a nod of respect to tradition," Burns adds. "We wanted the off-white Caliza signature to seem as if it was almost carved out of the main label. To further enhance the off-white signature and create depth, a scuff varnish was applied only to the background color. The off-white signature is on unprinted raw paper for increased contrast.

"Normally people see embossing and think it is a sign of an extra effort, but debossing is much more subtle and challenges one to think about why it appears different to them. Once they figure it out, it is like 'Aha, very cool, they pressed the logo into the paper instead of embossing it.' Additionally, debossing was used to smooth out the paper texture within the logo, for an enhanced affect."

To help differentiate the labels in the line, Caliza picked distinctive, modern color schemes to reflect the characteristics of each wine. For example, the labels for the red varieties – which include Azimuth, Companion, and Syrah blends – are printed two-color, black and red, on 60# Fasson® Classic Felt Natural White pressure-sensitive material. Black was chosen to give a solid, rich label background, and red was used to capture the vintage, matching a red wax capsule on the bottle.

Kissin' Cousins, the Caliza white Rhône blend, is printed two-color — a grassy green that is fresh and invites exploration, along with a dark beige — on Fasson® Uncoated Welded Litho pressure-sensitive white facestock. The colors were chosen to reflect the beautiful green and yellow of the vines and grapes of white wines, with a modern twist.

"With a name like Pink we just had to play off of the color," Burns continues. "For the Caliza rosé blend we deliberately used a shade of pink that is reflective of what is in the bottle. This is a smooth wine with structure and elegance, so we did not want a hot pink because that would have been too racy for the wine. We also did not want it to be too pale of a pink because it would have been too feminine. We chose a middle-of-the-road pink that felt just right." Caliza PINK is printed using a dark beige color ink on Fasson® Uncoated Welded Litho pressure-sensitive white facestock.

"We wanted to use very high-end, pressure-sensitive paper that would visually and tactilely reflect the quality of the wine," notes Burns. "We wanted something with grain and texture to mirror the handmade qualities of the wine."

To top off everything about the package, each bottle is hand-dipped in wax instead of being capped with a foil capsule, to help project the artisanal qualities of the wine and add another point of differentiation.

WS Packaging Group produced the labels on a Gallus TCS rotary offset press at its San Luis Obispo, CA, facility. Caliza wanted a solid, dense background color for each label. The labels are clean, crisp, and high-quality. Offset provided the best opportunity for printing on the Fasson® textured label material.

To ensure solid ink coverage, and matching of the PMS colors to the off-white pressure-sensitive material specific to the red blends, an ink drawdown technique was used to test the color of the ink mixture. In addition, a sculpted deboss die was developed to achieve maximum depth on the Caliza text.

"Since launching the Caliza brand, there has not been one day in the tasting room that someone does not comment on how much they like the Caliza label," says Pam Bowker. "Once they try the wines, our customers understand the plan for a bold and expressive label to go with a selection of equally bold and expressive wines."

The Caliza 2007 Companion vintage, released October 2010, won "Best of Show" in the Commercial Wine category for its label design at the 2010 Orange County Fair Wine Competition. ■

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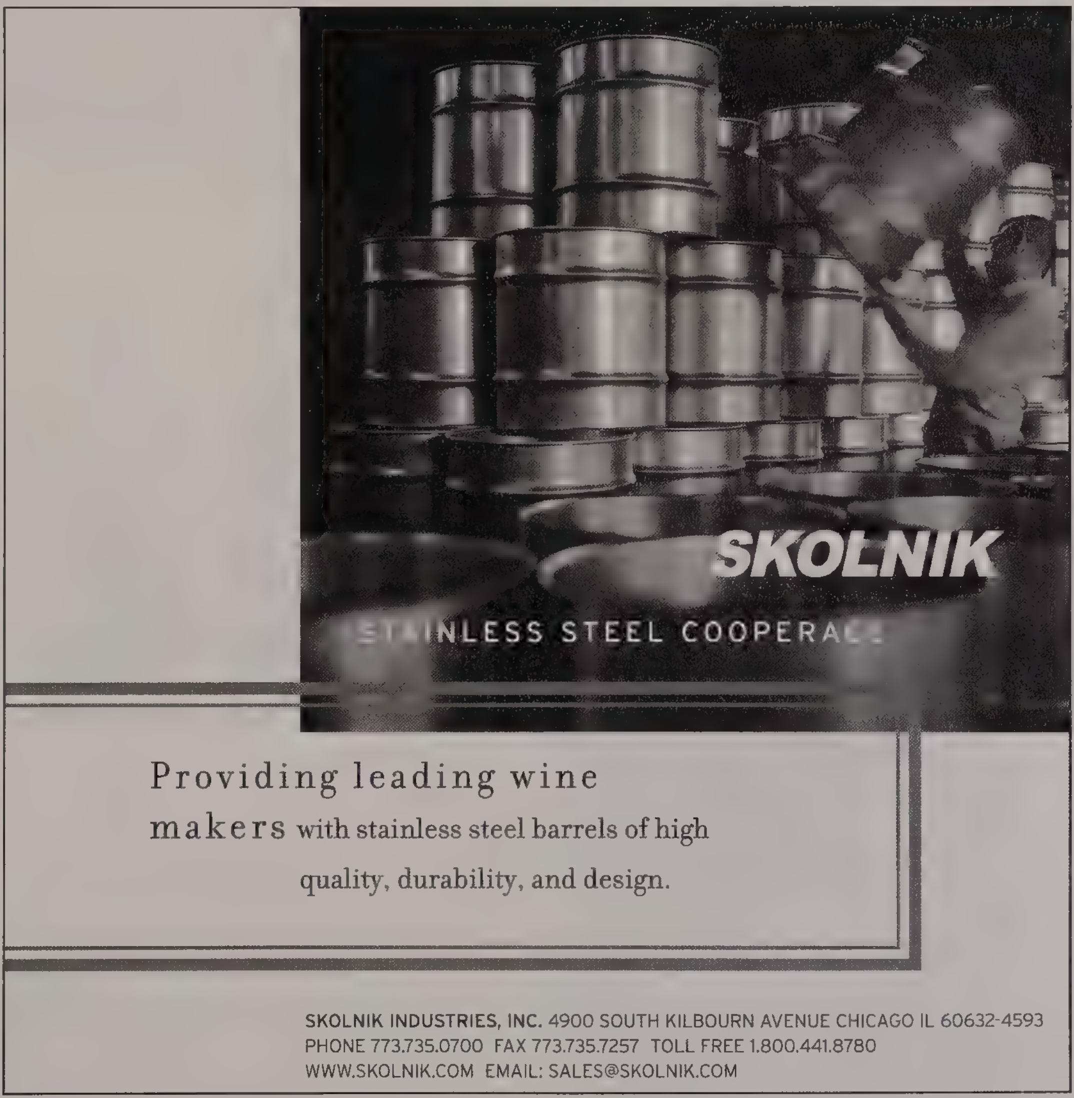
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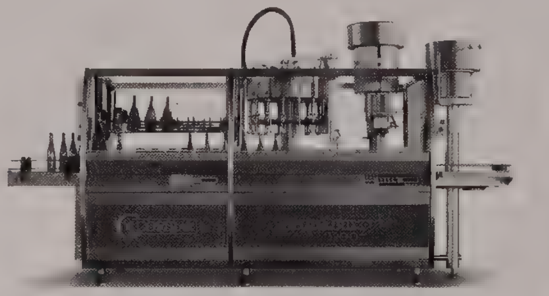

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BERGIN GLASS

Bergin Glass (BGI) has provided premier glass decorative services to the wine industry since 1988. BGI built its reputation on creating high-end artisan work, beginning with etched and hand-painted wine bottles. This decorating option has been almost exclusively reserved for large format sizes – 1.5L to 27L.

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PLEASE SEE O-I AD, PAGE 5.

AMORIM CORK AMERICA

Amorim Cork America is a subsidiary of Amorim and Irmãos, the world's largest manufacturer of natural cork wine closures, providing cork sales and custom finishing to wineries throughout North America. In addition to offering ROSA, a proprietary treatment that reduces TCA, the company was the first to offer sustainable FSC-certified cork closures.

AMORIM CORK AMERICA

Amorim's natural cork products include:

- Natural cork closures – recommended for all wines, especially those that require bottle aging;
- Twin Top® closure – ROSA-treated agglomerated mid-body, and INOS II-treated end discs. Twin Top is widely accepted for its price, performance, and sensory neutrality;
- Neutrocork® micro-agglomerated closure, made of small ROSA-treated particles, and price-competitive while maintaining excellent sensory values;
- Acquamark®, an inexpensive all-natural closure for wines meant for early consumption;
- Spark®, a sparkling wine closure that utilizes INOS II-washed disks to eliminate off aromas;
- Spark One®, a unit-molded sparkling wine closure that provides excellent performance at an attractive price;
- T-Cork®, a capsule-topped natural cork stopper that is ideal for fortified wines and spirits.

Amorim Cork America is a member of the Cork Quality Council.

For more information, contact:
Amorim Cork America
2557 Napa Valley Corporate Dr. #A,
Napa, CA 94558
tel: 707/224-6000; fax: 707/224-7616
e-mail: info.acam@amorim.com
website: www.amorimca.com

PLEASE SEE AMORIM CORK AD, PAGE 29.

GLOBAL PACKAGE, LLC

Global Package offers packaging solutions and quality service for wineries to source all glass needs with one-stop shopping.

The company is extending the beautiful Elegant Light Line of bottles. Global Package offers more than nine shapes, all with the unique 31.5mm ring finish which marks the style of higher quality premium and ultra-premium wines. Global Package can satisfy both the winery design team from the perspective of uniqueness and label palette size, and the winery owner for purchasing efficiencies in packaging materials. Wineries achieve cost savings along with creative longevity.

Wineries may wish to boost the package look with pewter labels, to jazz up an existing design. These self-adhesive labels are now used to top off corks, add a reserve embellishment, or add focus to a winery brand. They can be colorized in gold, bronze, and copper. Ask for samples and assistance.

The Global Package website is friendly, informative, and has unique offerings, so wineries are encouraged to browse for new packaging ideas, or visit the Napa showroom to learn more.

For more information, contact:
Global Package, LLC
PO Box 634, Napa, CA 94559
tel: 707/224-5670
website: www.globalpackage.net

CHART INC.

Chart Inc. is a leader in liquid nitrogen (LN2) delivery systems for oxygen displacement. Chart has worked exclusively with winemakers to integrate and optimize technology on screw cap bottling lines, to reduce headspace oxygen, and extend shelf-life while preserving taste.

Chart's technology has consistently provided 90%-95% reduction in headspace oxygen content, and 59% reduction in total package oxygen, compared to traditional gas nitrogen sparging. This consistency allows winemakers to confidently control the use of sulfur dioxide while maintaining an acceptable free sulfur dioxide level.

CHART®

One winemaker reported dissolved oxygen content less than 0.03 ppm without compromising the fresh fruit taste of the wine, with Chart's dosing equipment.

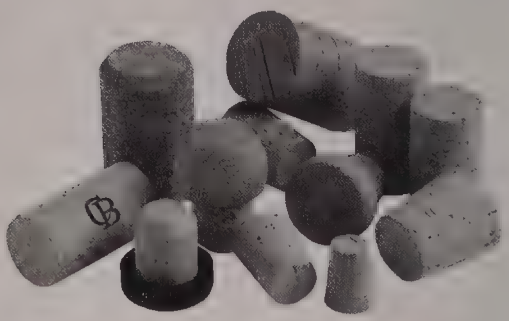
Chart has a complete line of standalone dosing systems to accommodate a variety of bottling line conditions and speeds. A precise dose of LN2 is injected into the headspace prior to capping. The liquid dose warms and turns into 700 parts of gas, displacing O2 from the headspace. With more than 1,000 dosing systems installed, Chart has a wealth of application-specific knowledge.

For more information, contact:
Chart Inc.
161 Baypointe Parkway, San Jose, CA 95134
tel: 800/371-3303; fax: 408/577-1567
e-mail: ln2dosers@chart-ind.com
website: www.chartdosers.com

PLEASE SEE CHART AD, PAGE 27.

CORTICA BENICIA USA

Cortica Benicia USA (CB USA) produces and distributes a large variety of corks, from very small tapered corks to champagne corks, wine corks to fit any bottle, bar tops (with both plastic and wooden caps), and more. CB USA will print, stamp, and/or color corks to match most designs. CB USA corks are scrutinized using the most sophisticated equipment available, and are very reasonably priced.



The laboratories of CB USA are state-of-the-art, analyzing corks of the highest quality. They are equipped with the latest mechanical, chemical, and sensory devices to ensure the very best product available. CB USA provides innovation and technology with an eye to sound environmental and ecological protection.

CB USA supplies a full range of products including:

- Premium natural wine corks,
- 1+1 (Twin-disc), champagne, and technical corks,
- Plastic champagne stoppers and wirehoods,
- Screw caps (tin and saranex),
- Capsules (polylam and PVC),
- Bar tops,
- Wax and more.

Visit the CB USA website for more information at www.cbcork.com.

For more information, contact:
Cortica Benicia USA
2487 Courage Drive, Fairfield, CA 94533
tel: 800/532-2207
e-mail: info@cbcork.com
website: www.cbcork.com

PLEASE SEE CORTICA BENICIA AD, PAGE 41.

MONVERA GLASS DÉCOR

Monvera Glass Décor offers eye-catching bottle decoration services such as screen printing, etching and decals. With unique labeling options like these, a winery package will stand out on shelves that are full of traditional paper labels.

monvera
Glass Décor

Screen printing gives graphic designers unique and interesting ways to create new labels. Monvera can print from the base to the shoulder of the bottle, create full wraps, halftones, side labels and more. From an existing paper label, Monvera can refresh the package with a screen-printed approach that preserves brand identity. To receive a complimentary digital mockup of what a paper label would like screen-printed, e-mail label art to Monvera.

Monvera's team of dedicated professionals is committed to providing the best quality and customer service available. Experts will guide the winery through the full range of options for decorating bottles and glassware in a manner that enhances brand and product appeal.

Monvera is located in a 42,000-square foot facility in Richmond, CA. With multiple ovens and printing machines, Monvera can accommodate any order quantity, from 100 cases to thousands.

For more information, contact:
Monvera Glass Décor
1414 Harbour Way S. Ste 1400
tel: 510/444-9463
e-mail: info@monvera.com
website: www.monvera.com

PLEASE SEE MONVERA GLASS DÉCOR AD, PAGE 70.

LAFITTE CORK & CAPSULE

Family owned since its inception, Lafitte has produced high quality cork products for more than five generations. In 1956 Lafitte moved its major production site from France to Northern Portugal, home of thriving and sustainable cork forests. This move allowed Lafitte to be directly involved in timely cork forest management.

Lafitte
CORK & CAPSULE
Crowning the Achievements of Fine Wine

In 1982, Laffite Cork & Capsule was established in Napa to process cork and capsules for direct sale to North American customers. Along with continuing research and development, Lafitte believes that product quality is assured through proactive professional involvement with customers. The experienced and knowledgeable sales team is involved at every step to evaluate, solve problems, and give advice based upon the needs of enologists and winemakers. Lafitte is committed to developing long-term partnerships in order to ensure customer satisfaction.

Lafitte closure products include:

- Natural cork stoppers
- 1+1 (twin-top)
- Agglomerated
- Micro-agglomerated
- Colmated

Lafitte capsule products include:

- Tin
- Alustar (aluminum)
- Poly-laminate
- PVC

For more information, contact:
Lafitte Cork & Capsule
45 Executive Ct, Napa, CA 94558
tel: 707/258-2675; fax: 707/258-0558
e-mail: sales@lafitte-usa.com
website: www.lafitte-usa.com

PLEASE SEE LAFITTE CORK & CAPSULE AD, PAGE 55.

TRICORBRAUN WINEPAK

TricorBraun WinePak is synonymous with options, including the ECO SeriesTM of wine bottles from Verallia (TricorBraun is a preferred supplier for Verallia), a smart move towards sustainability.

TRICORBRAUN
winepak

Many styles of capsules from Amcor are available, as well as popular Bag-in-Box, for which TricorBraun WinePak can supply the bags, spouts, boxes, and rental equipment for filling.

TricorBraun WinePak has in-stock options for multiple styles of both imported and domestically-sourced bottles. The fully automated, state-of-the-art repacking operation can transfer wine bottles from eight-foot-high stacks of pallets to custom, 12-bottle cartons with speed and efficiency.

TricorBraun has offices in Canada, Washington, Oregon, and California.

For more information, contact:
TricorBraun WinePak
2280 Cordelia Rd, Fairfield, CA 94534
tel: 707/399-5800; fax: 707/399-5850
e-mail: abottene@tricorbraunwinepak.com
website: www.tricorbraunwinepak.com
TricorBraun Oregon
2622 North Marine Dr, Portland, OR 97217
tel: 503/221-9990; toll free: 800/525-4981
fax: 503/221-9977
TricorBraun Washington
22615 83rd Ave S, Kent, WA 98032
tel: 253/872-0858; fax: 253/872-4575
TricorBraun Vancouver
1650 Brigantine Dr, Unit 500, Coquitlam, BC V3K 7B5
tel: 604/540-8166; fax: 604/540-8160
TricorBraun Toronto
7050 Woodbine Ave, Ste 203, Markham, Ontario L3R 4G8
tel: 416/213-7474; fax: 416/213-7469
TricorBraun Santa Rosa
975 Corporate Center Pkwy/Suite 120, Santa Rosa CA 95407
tel: 707/566-9000; fax: 707/303-1490
e-mail: sgordon@tricorbraunwinepak.com

PLEASE SEE TRICORBRAUN WINEPAK AD, PAGE 2.

VERALLIA NORTH AMERICA

As a leading glass container supplier to American wineries, Verallia North America offers a legacy of product innovation, craftsmanship, and customer attention. The company is committed to maintaining this position in the market through forward-looking technologies, and by providing the services customers require. Verallia has focused on both innovation and customer support through two company-wide initiatives, Vision2Sustain^{SM} and The Vision4Glass^{SM} Process.

The Vision2Sustain^{SM} initiative was created in order to facilitate the ongoing development of eco-friendly products and practices. The Vision4GlassSM Process allows designers to be involved in the earliest design phase with customers, to shorten package development time.

Both initiatives have been combined to develop a major improvement in sustainable design and manufacturing – Verallia's ECO Series^{TM}. This innovative series of bottles maintains quality and attributes associated with the customer's glass container needs, while reducing the overall impact on the environment. See listing for distributor CaliberWinePak for more details on the ECO Series^{TM} line of wine bottles.

Verallia is proud of its partnerships with America's most accomplished vintners and the role its products have played in the growing worldwide recognition of American wines.

For more information, contact:
Verallia North America
2600 Stanford Ct, Fairfield, CA 94533
tel: 707/437-8717; fax: 707/437-8741
e-mail: marketing@saint-gobain.com
website: www.verallia.com

PLEASE SEE VERALLIA AD, PAGE 56.

ALL AMERICAN CONTAINERS

All American Containers (AAC) is one of the largest suppliers of glass, plastic and metal containers, tubes and dispensers, and plastic and metal closures in the U.S. More than 40 years of personal experience and knowledge in the packaging and closure industry bring wineries quality, effectiveness, innovation, and unsurpassed service.

AAC carries a complete line of wine bottles, corks, and capsules in a wide selection of colors, shapes, styles, and sizes. Bi-coastal warehouses service the entire United States, and AAC delivers daily to customers in all markets, whether the operation is large or small.

East Coast: All American Containers East Coast has a large warehouse near Pittsburgh, PA. Most items are produced in the U.S., with many specialty and hard-to-find items also available and imported from Europe.

Pacific Coast: All American Containers Pacific Coast opened a new facility in Santa Rosa, CA, a spacious warehouse at the hub of North Coast wine country. Having stock locally enables faster delivery and convenient customer pick up options are available.

For more information, contact:
All American Containers, West Coast Wine Division
Marty Sychowski
tel: 707/544-3496; fax: 707/544-7398
e-mail: martyS@aacpacificcoast.com
website: www.aacwine.com

PLEASE SEE ALL AMERICAN CONTAINERS AD, PAGE 92.

RIVERCAP USA

Rivercap USA's new manufacturing facility in Benicia, CA, is now producing polylaminate and PVC capsules, and the company continues to produce top quality tin capsules in Spain. With local access to technical expertise, capsule variety, and service, Rivercap USA's commitment to local winemakers is stronger and closer than ever.

Rivercap premium quality capsules add the perfect finish to a wine bottle. An infinite array of dimensional, color, design, top-emboss, and side-print possibilities makes it easy to customize perfection.

500 million bottles per year from thousands of the world's finest wineries depend on Rivercap capsules for consistent quality, performance, and style.

Among many Rivercap "firsts" are launch of the popular, lightweight 80-micron capsule, and the inside/outside super-cleaning capsule system for improved capsule performance.

Other critical Rivercap advantages include:

- a nine-stage deep-drawn shell for an elegant, flawless finish;
- two-color registered side printing;
- high-resolution top embossing;
- high scuff-resistance;
- flexible product dimensions;
- compliance with CONEG heavy metal limits (under 100 ppm).

All Rivercap products are distributed exclusively by Cork Supply USA with an enthusiastic, veteran sales and support team. Rivercap capsules are online at www.corksupply.com. Stock tin, PVC, and poly-lam capsules are available from California inventory.

For more information, contact:
Rivercap USA
531 Stone Road, Benicia, CA 94510
tel: 707/747-3630; fax: 707/746-7471
e-mail: jbell@rivercapusa.com
website: www.corksupply.com

PLEASE SEE RIVERCAP USA AD, PAGE 18.

CASTORO BOTTLING COMPANY

Since 1989, Castoro Bottling has served wineries throughout California with a fleet of high-tech mobile bottling lines. The demand for Castoro Bottling's timely, professional, and knowledgeable service has triggered the bottling of more than 60 million bottles of wine with natural cork, synthetic closures, and screwcaps.

CASTORO BOTTLING CO.
CBC
FILLING YOUR NEEDS

Castoro Bottling offers five technologically-advanced mobile bottling lines that arrive on the winery's schedule to serve all bottling needs. Castoro Bottling can bottle up to 2,500 cases per day, serving any size winery. No job is too small or large. A number of custom services are offered, including labeling and packaging consultation. Recognizing the need for wineries to offer alternative closures, Castoro Bottling has outfitted three bottling lines with screw capping and Zork capability. Castoro Bottling can handle 187ml bottles.

"Our investment in the best equipment and the best people to run that equipment is what sets Castoro Bottling apart," says Niels Udsen. "We anticipate the needs of a winery better than any other bottler simply because I have owned and operated a successful winery for nearly 30 years. Castoro Bottling is a partner who knows and understands your business."

Castoro Bottling Company offers Velcorin dosing, and liquid nitrogen for screw capping. Please call or visit the website.

For more information, contact:
Castoro Bottling Company
Niels Udsen
PO Box 954, Templeton, CA 93465
tel: 805/467-2002; fax: 805/467-2004
e-mail: Niels@castorobottling.com
website: www.castorobottling.com

PLEASE SEE CASTORO BOTTLING AD, PAGE 90.

SCOTT LABORATORIES, INC.

Scott Laboratories Inc. announces the 2012 expansion of facilities, with a newly-opened 32,000-s.f. office at Pine View Way in Petaluma, CA, across the street from Scott Labs' main facility. The new building houses a state-of-the-art cork processing plant, parts and service department, and wine analysis laboratory.

As a founding member of the Cork Quality Council, ensuring quality and consistency has always been essential to Scott Laboratories. The modern cork processing facility is complete with critical quality assurance tools, such as AiroCide units, ozone protection, and a dedicated sensory evaluation room available to customers for sensory analysis. Scott Labs has commissioned a new electrical branding machine with heat controls, which will allow for perfectly consistent branding.

"All of these improvements continue to reinforce Scott's status as the quality leader in the cork market," notes cork plant general manager, Alex Scott.

Other improvements to the new space include an enlarged machine shop and parts storage warehouse, along with expanded shipping and receiving capabilities. Customers are invited to tour the new facility, view the cork processing area, and learn about the wide range of product offerings available.

For more information, contact:
Scott Laboratories, Inc.
PO Box 4559, Petaluma, CA 94955
tel: 707/765-6666; fax: 707/765-6674
e-mail: info@scottlab.com
website: www.scottlab.com

PLEASE SCOTT LABORATORIES AD, PAGE 74.

SAVERGLASS, INC.

For decades, Saverglass has been the supplier of choice for discerning wineries looking for classic but distinct bottle design, unmatched glass quality, and impeccable service. Whether the wine is a Bordeaux Grand Cru, an acclaimed Napa Cabernet, or a rising wine star in Paso Robles, Lodi, or Walla Walla, wineries continue to rely on Saverglass bottles for their exclusive wines. Saverglass brings innovative solutions to U.S. customers with the recent addition of the **EcoDesign** line of bottles, the **SelectColors** glass coloring process, and the 100% sustainable new **ColorPlay** decorating process.

SAVERGLASS
ESPRIT DESIGN

Saverglass offers:

- Classic but distinguishable bottle designs in standard colors: Antique Green, Champagne Green, Dead Leaf Green, Dark Amber, and Flint;
- Flexible production capacity with low volume minimums;
- More than 1,600 mold designs, many kept in stock;
- Unmatched glass quality, from design discipline, to glass-making expertise, and many quality controls;
- Expertise in specific mold development, and customization of existing molds;
- Capability to decorate glass bottles, now with ColorPlay organic inks;
- Bottles available directly from Saverglass Inc., or through selected U.S. packaging distributors.

For more information contact:
Saverglass Inc.
West Coast: Sylvie Langlois, Petra Gillier, Lili Sanchez
841 Latour Ct., Suite B, Napa, CA 94558
tel: 707/259-2930
East and Central States:
JC Forster, Joshua Heintz, Anna Cutri
107 Spring St. #210, Ramsey, NJ 07446
tel: 201/825-7100
website: www.saverglass.com

G3 ENTERPRISES

G3 is a leading packaging manufacturer and logistics service provider with generations of experience in the following areas:

Custom Label Printing: G3 provides full service capabilities from customized pressure-sensitive or cut and stack labels, and bottle etching. G3 recently introduced 100% PCW wine labels, GTREE®.

Custom and Stock Closures: G3 offers an extensive selection of closures, including screw caps, DIAM®, VinoTop, capsules, champagne stoppers, bar tops, and crowns. Now customers can order a wide range of stock closures online at www.G3order.com.

Transportation: G3 transfers grapes to crush facilities, transports bulk commodities, manages imports and exports, and moves products via boxcar, intermodal, and truck.

Warehousing: G3 has more than 3 million square feet of warehouse space in California's Central Valley, Chicago, and warehouse partnerships in Pennsylvania, Georgia, Florida, Texas, Kansas, New Jersey, and the United Kingdom.

Mobile Bottling: G3's bottling lines include the first mobile bag-in-box, and an alternative packaging line capable of bottling PET, flat panel, and aluminum bottles.

Winery Services: Services and products offered include wine sourcing, label printing, wine closures, glass and cartons, and bottling services.

For more information, contact:
502 East Whitmore Ave, Modesto, CA 95358
tel: 800/321-8747
e-mail: g3.info@g3enterprises.com
www.g3enterprises.com

PLEASE SEE G3 ENTERPRISES AD, PAGE 47.

DIAM

DIAM® closure allows winemakers to choose how they want their wine to evolve. The DIAM closure is treated with the patented DIAMANT process. Validated by several worldwide independent laboratories, the DIAMANT process uses supercritical CO_t to eradicate 2,4,6 – trichloroanisole (TCA) and 150 additional compounds that are naturally found in corkwood, potentially creating off-flavors in wine. Every DIAM closure is guaranteed no TCA (less than 0.5 ng/L by GC/MS). No other producer can make this claim.

The combination of supercritical CO_2 and microspheres provides a DIAM closure that is clean and consistent. There is no bottle variation, and winemakers can choose from three DIAM Oxygen Transmission Rate (OTR) options to meet their specific needs.

For more information about DIAM and DIAMANT process, please go to NoCorkTCA.com

In North America, G3 is the exclusive distributor of the DIAM products:

- Still wine (DIAM)
- Sparkling wine (Mytik)
- Beer corks
- Bar tops (Altop)

For more information, contact:
G3 Enterprises
502 E. Whitmore Ave, Modesto, CA 95358
tel: 800/321-8747
e-mail: g3.info@g3enterprises.com
website: www.nocorktca.com

PLEASE SEE DIAM AD, PAGE 47.

VITRO PACKAGING LLC

The wine industry is changing at record pace and Vitro Packaging, LLC understands the need to respond to changing trends. The shape and color of a wine bottle communicates to the consumer a great deal about the brand. Vitro, one of the largest wine bottle manufacturers, has invested in creating the largest stock mold inventory program in North America.

Vitro offers a variety of Bordeaux, Burgundy, and Hock bottles in an assortment of glass colors including deadleaf green, flint (clear), antique green, champagne green, emerald green, Georgia green, amber, smoke, and "cobalt blue," with and a variety of punt and finish options. Secondary package offerings and pre-labeling systems make Vitro Packaging, LLC a leader in the glass wine bottle industry.

Vitro Packaging now offers the VinoLite Collection, 15 to 20% lighter on average to Vitro's current stock bottles. With five Bordeaux bottle choices, and four Burgundy bottles, this new collection supports wine industry trends and is the perfect solution for sustainability efforts.

Vitro is a Glass Packaging Institute Clear Choice award winner in multiple beverage categories.

For more information, contact:
Vitro Packaging LLC
Lee Whalen, Wine Division West Coast
lwhalen@vitro.com
tel: 707/551-1404
Michelle Hederich, Wine Sales Director
mhederich@vitro.com
tel: 469/443-1000
website: www.vitropackaging.com

COLLOPACK SOLUTIONS, LLC

CholloPack Solutions is a leading provider of integrated bottling lines and grape processing systems. ColloPack offers a comprehensive line of bottling equipment from single machine replacements to complete lines, including:

- Bertolaso Cleaner/Filler/Corker/Capper Bloc;
- Robino & Galandrino capsuling equipment;
- Cavagnino & Gatti pressure-sensitive and wet-glue labelers;
- Francesca pumps;
- Bertolaso automated conveying systems;
- Perrier & Champagel sparkling wine bottling machinery;
- CIVision bottle, closure, and label inspection/rejection systems.
- Albrigi stainless steel tanks

Albrigi stainless steel tanks are crafted to the highest standards in Italy. Unique standard features include exclusive use of Thyssen Krupp German 304L stainless steel; "BA" (bright annealed) finish rather than common 2B finish; rolled, ground flat and polished welds; pickled welds and passivated tank interiors. Fittings and accessories are the finest available. Albrigi tanks provide unique advantages in cleaning and sterilization and are visually stunning. The Albrigi product line covers traditionally designed storage and fermentation tanks and a variety of technologically-advanced fermentation cap management systems.

ColloPack also provides engineering, project management, installation of equipment, conveyors, and electrical, and after-sales service and parts programs customized to each winery's needs.

For more information, contact:
ColloPack Solutions, LLC
Dave Means, Phil Giacalone, Rick White, Joe Mironicki, Craig Richardson or Greg Fulford
193 Camino Dorado, Napa, CA 94558
tel: 707/258-3940; fax: 707/258-3949
e-mail: sales@collopack.com
website: www.collopack.com

CORK SUPPLY

Cork Supply USA announces the addition of a new Triple Quadrupole GC which sets a new standard for detection of trace compounds from complete sample matrices. By using several mass spectrometers in tandem, sensitivity for all compounds analyzed is heightened, with sample preparation and run times shortened. With two GCMS and one HPLC machine, Cork Supply's technical services team will optimize quality control analysis of TCA, TBA, TeCA, and PCA, reducing the occurrence of false-positive results and other sample interferences while optimizing turn-around time in sample analysis.

Cork Supply USA now offers DS100, a dry-soak inspection process that guarantees the individual inspection of every single cork by testing 100% of a customer's order for off-aromas, including TCA. This non-destructive dry-soak method isolates and examines each cork individually in the Cork Supply laboratory.

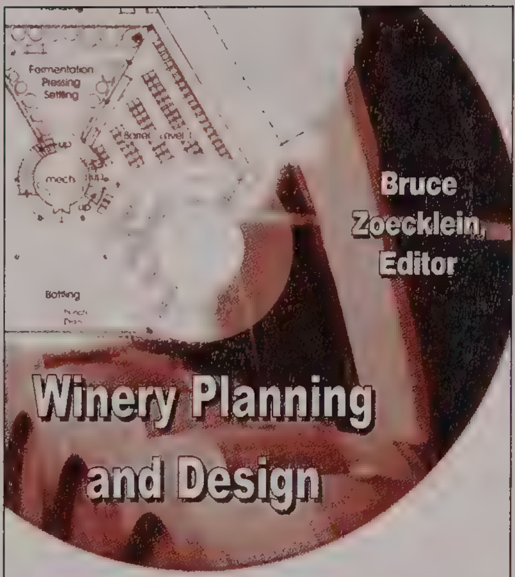
DS100

Founded in California in 1981, Cork Supply is a primary supplier of premium natural wine corks in North America. Recognized as wine industry "Top-Of-The-Bottle Experts," the experienced sales, customer service, and technical laboratory professionals at Cork Supply can help select and customize the right finish for each wine.

Only natural corks from Cork Supply have the added critical advantage of Innocork®, a patented TCA-removal process that delivers ultra-clean, virtually perfect natural corks.

For more information, contact:
Cork Supply
531 Stone Road, Benicia, CA 94510
tel: 707/746-0353; fax: 707/746-7471
e-mail: csu@corksupply.com
website: www.corksupply.com

PLEASE SEE CORK SUPPLY AD, PAGE 25.



16th edition now available!

A comprehensive work on CD which covers basic essentials of planning and designing a winery.

The latest edition provides access to five hours on sustainability (Adobe Presenter) and includes architecture layouts with examples.

Topics include:
Winery Business Planning
Winery Economics
Winery Design
Winery Equipment
Winery Legal Issues
Winery Refrigeration
Winery Water Requirements
Winery Wastewater Treatment
Winery Laboratory
HACCP Planning
Sustainability

This CD is exclusively available at practicalwinery.com for $120.

SWEET WINE

Consumers give the prompts– *But are wineries listening?*

BY Tim Hanni, MW

Enough is enough, for crying out loud. The wine industry has become so mired in metaphors and misinformation about sweet wines that we continue to dismiss, and even openly and ignorantly ridicule, a huge market opportunity that other beverage companies leverage and rely on for their greatest profits.

Why are we so resolute that sweet wines, and sweet wine consumers, are somehow bad for business? The preference for sweet wines is a natural phenomenon and sweet wine consumers have always been with us in spite of our misguided and ignorant attitudes about who sweet wine consumers are, and why they like what they like. Revisiting the centuries of popularity of sweet wines in the culture and at the table in France and Italy will enlighten us.

Historical perspective

What I mean by sweet wines is a category of products, typically with 2% to 8% residual sugar, that have been with us for a long, long time. Over the decades, wines such as White Zinfandel, Liebfraumilch, various forms of popular rosé wines like Lancer's and Mateus, and even red wines like Lambrusco provided wine lovers with the products they find delicious and satisfying with their meals or on their own. Not wines for "beginners, unsophisticated, or naïve" consumers – simply consumers who demand a sweet product.

Somehow we have lost sight of the fact that until well after World War II, a Liebfraumilch was typically priced higher than a Cru Classé Bordeaux! Imagine what could happen for the wine industry if we were to restore that kind of value to the continuously undervalued sweet wine segment.

Current trends for sweet drinks

Just take a look around in any bar or club and see what the highest priced and most popular drinks are – they are all sweet. Or hop into your local Starbucks and look at the menu – $3 will buy a cup of coffee displaying the "terroir of Sumatra" but a MochaLatteCaramelCino will run you $6. They sell so much of these coffee drinks that Starbucks internally refers to itself as a MILK company! Yet the wine industry seems, for the most part, content to embarrass and disenfranchise these same money-spending and hugely valuable people.

According to the latest Nielsen data the sweet red wines and Moscato categories continue to grow tremendously. The sweet red category grew 133.6% in the four weeks ending March 31 and Moscato was up 35.9% during the same period and is now the #3 selling white varietal wine in the U.S. In the 13 weeks ending March 31, 2012 sales of sweet red wine grew 138.9% and Moscato sales grew 40.9%. It is time that the wine industry wake up and start to understand, engage, and cultivate this huge segment of the market.

It is time once and for all that we set the record straight, get away from the myths and lore surrounding sweet wine and respond to the millions, potentially billions, of consumers who will always prefer sweet wines.

The French historically preferred, and even paid a premium for, sweet wines – not off-dry wines, really sweet wines. Same with the Italians. The preference for sweet is a human phenomenon and more than one-half of people are genetically predisposed to want more sweetness than others. This is not an "everyone is above average" joke, but a fact of the physiological palate.

Waking up the wine industry

Sweet wine drinkers are not in need of education, but the wine community certainly is due for a remedial course on wine history and market research. Sweet wine drinkers do not think the wines they love "do not go with food." Only the myopic mind of the wine industry could come up with that prohibition to deter wine consumption.

Sweet wine drinkers are not looking for wines that are drier, more acidic, or more complex. They, like consumers in France and Italy back when wine was popular in those countries, want sweet. Sweet wines ruled in Europe – from Sangria in Spain to the Kir wine cocktail in France, and including wines that no one now can even remember being really sweet like Montrachet and "dry" Champagne (technically 60 g/L is considered dry, or sec, in Champagne!). Amarone was historically always sweet, as were almost all of the white Rhône wines. Consider that as wine has become drier and more "precious" in France and Italy per capita wine consumption in these countries has plummeted over 50% in the past 50 years.

To the wine industry: Get over it and stop spreading really bad information like "Americans like sweet wines because we were brought up drinking Coke." A significant consumer segment wants sweet wines – in France, the U.S., China, and every other market in the world. Not sweet by the wine industry standards, sweet by the wine drinker's standards.

"As night follows day, Consumers continue the journey of Sweet to Dry" was the opening line of a recent presentation by the former CEO of one of the world's largest wine producers. The real truth is that "as sure as night follows day, the global wine industry will continue to misrepresent, misunderstand, and disenfranchise sweet wine drinkers while fettering away potentially billions of dollars in lost revenue to beer and spirits producers." It is this kind of inaccurate and misguided information that has disenfranchised millions of potential wine consumers and prevents us all from having a more vibrant, sustainable, and profitable industry.

Whatever steps the wine "cognoscenti" take to make "better" wine, i.e., drier, oak-aged, with more acidity, and higher alcohol, are invariably steps away from the flavor preferences of sweet wine consumers. The wines need to be developed using the target consumer group as the arbiters of flavor and balance, not the myopic wine experts who will only try to impose our will, and misguided stamp of approval, on the products.

I was approached by a major producer seven years ago and told him Moscato was the next big thing. I summarily

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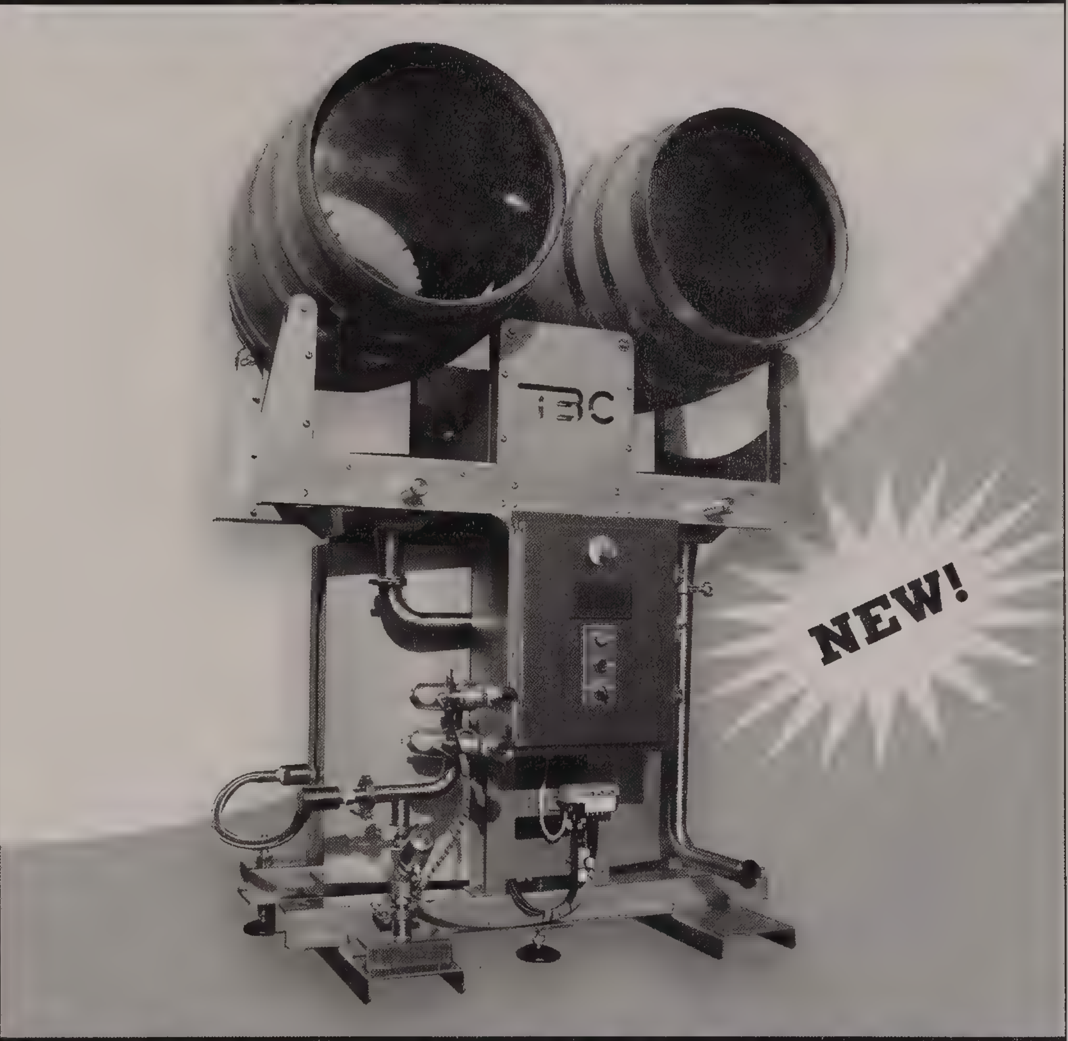

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dismissed trial after trial of drier or oak-aged or more complex samples the winemaking team submitted and steered direction to what my research clearly showed consumers actually wanted. The wine that eventually went into production was declared "too sweet, not enough acidity, not enough complexity." It went from 100,000 cases to over 3 million cases in five years.

Moscato is now the third largest selling white wine variety by volume, growing at 70% compared to 7% for #4 Sauvignon Blanc in the U.S. Similar opportunities exist for wineries in every wine producing country to develop and sell high quality sweet wines to markets all around the world.

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What can a winery do?

How can a producer take advantage of this opportunity? On page 69 are my recommendations:

EBERLE

Eberle Winery (Paso Robles, CA), has produced Muscat Canelli since 1978. Gary Eberle, owner, modeled the style in which he makes this wine after the Robert Mondavi Moscato de Oro. Four acres of Muscat were planted on the Eberle Estate vineyard in 1987, which remains the primary fruit source. Annual production is 1,400 to 1,500 cases.

"Gary's wife was actually the first person to encourage him to make the Muscat because she loved the crisp, refreshing style of this wine, along with the perfect balance of sweetness," explains Stacy Miller, Sales and Marketing Director.

"Because of the versatile style in which we make our Muscat, (56 grams/liter residual sugar while keeping a healthy acid balance above 0.9), we market this wine as not only a dessert wine, but also a wine that can be enjoyed as an aperitif, a refreshing summer sipper by itself, or a wine that pairs delightfully with spicy food.

"We use our Muscat for nearly every dinner we have at the winery. Some of the pairings I have seen over the years include a honeydew melon soup with cayenne pepper, anything that has goat cheese, a fresh fruit salad marinated in Muscat, or poached pears. This wine also pairs nicely with anything spicy, from Thai to Mexican dishes."

Eberle wines are distributed in 34 states and 5 countries. About 40% of the annual production is sold to the wholesale market. The Muscat is distributed in 18 states as well as Hong Kong and Alberta, Canada.

TECHNICAL NOTES

2010 Muscat Canelli 'Estate'
Alcohol: 12.4%
Acidity/pH: 0.95/2.96
Residual sugar: 5.6%
Dissolved CO_2: 1,200 mg/L

- Understand we are talking about real people and they represent a huge opportunity. They do not need to be "educated" and are not in need of being "saved" by enlightened wine "experts" who seem intent on saving them from a tragic life of wine and food mismatches. They just prefer sweet wines. Do we want to eliminate the arrogance and intimidation associated with wine? Now is your chance.
- Embrace sweet wine consumers. Teach servers in restaurants, sommeliers, wine consultants, and anyone involved in hospitality and wine education that sweet wine drinkers are some of the most sensitive tasters on the planet. Openly engage and respect them. Stop with the arched eyebrows and even open hostility. YOU do not have to like sweet wine, make sweet wine or serve sweet wine, but let's stop this nonsensical disenfranchisement we have created.
- Cultivate sweet wine drinkers on their terms – making sweet, fragrant, and wonderfully pure expressions of wines at increasingly higher price points while making them feel that it is completely appropriate for them to enjoy the wines they love the most with their meals: steaks, seafood, or pasta – just like it used to be in France or Italy.

Summary

You are going to see a continued growth in sweet wine consumption; what we are seeing now is just the tip of the iceberg. In the centennial year of the Titanic tragedy, do you want to try to sink the sweet wine ship and send new and existing consumers to the spirits and beer sectors of the adult beverage category? They think like marketers, not

KENWOOD

Kenwood first bottled a 2010 Moscato (about 1,200 cases) in the same package used on all Kenwood Sonoma and North Coast wines. It was only selling well in a few markets. "In summer/2011, we were already seeing the huge explosion in this variety," recalls Mark Koppen, marketing manager. "I saw Moscato as an opportunity to introduce some new and younger consumers to the Kenwood brand. Kenwood typically skews a bit older in its demographic, age 35 and older."

There was also some new research by Liz Thach (Sonoma State University) about the wine consumption patterns of millennial consumers. In this research (published 7/11/11 at www.winebusiness.com) it was shown that millennials were drinking sweet wines of all types (whether sweet reds, sweet whites, and dessert wines) more in non-meal occasions than meal occasions. "We also knew from anecdotal observations that Moscato consumption skewed heavily towards women," adds Koppen, "in 'cocktail' type situations.

We repositioned Kenwood Moscato with a fanciful name, in a new, more colorful package, priced above the fighting varietals like Barefoot, Sutter Home, et al. There is very little California Moscato above $10; most in that range are from Italy. We wanted Kenwood Moscato to 'step up' as a brand above $5-$7.

"For the 2011 vintage, the name became Moscato Zacchera ('splash' in Italian), with colors to stand out on the shelf for consumers, and maintained the Kenwood brand on the label. Even with very tight supply we were able to expand production to 6,000 cases, still very small compared to the big players. We believe the potential for Moscato Zacchera is huge. We also plan to produce a sweet red companion, Rosso Zacchera, in the upcoming 2012 vintage.

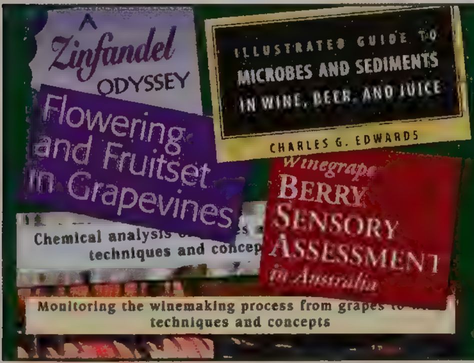
"Our thinking from the beginning as to distribution channels has been a focus on retail – both wine shops and selected chains, adding more outlets as supply permits. Again, we feel the package will catch the consumer's eye, and the Kenwood name gives an assurance of quality, especially to those who already know the brand.

"On occasions where a consumer may be looking to buy something a bit more upscale to take to a party, etc. Moscato Zacchera fills that need well. Most recently, as we take this wine to market, we have seen some potential for on-premise By-the-Glass business too, as bars and restaurants look for an upscale Moscato from California to pour for customers. This channel is still developing and we are exploring its potential.

Pat Henderson, senior winemaker, welcomes the wine to "round out" the portfolio as a dessert wine when doing formal dinners with the Kenwood portfolio. "As with most Moscatos, it is a great match with desserts like fruit tarts, biscotti, etc.," concludes Koppen. "This is a valid use, of course, but not the primary effort on Moscato Zacchera."

TECHNICAL NOTES

Alcohol: 12.0%
Acidity/pH: 0.66/3.24
Residual sugar: 4.7%
Dissolved CO_2: 1060 mg/L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It is time to put an end to the tyranny of the "dry wine is good wine" misunderstanding. ■

ST SUPÉRY
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NAPA VALLEY

St. Supery has been making Moscato since the 1990s. "Originally, we made this wine for tasting room direct sales," says Emma Swain (CEO). "It was enormously popular with visitors to the tasting room so we developed a wine club specifically for our Moscato and expanded into national distribution of the wine. Sales of Moscato have been highest in the "sweet tea" territory of the southeastern U.S., especially in Georgia and Florida.

"St. Supéry Estate grows about half of the Muscat Canelli in all of Napa Valley and our Moscato has been selling out faster every year. In 2009, we found that most of our on premise accounts were not only selling the Moscato by-the-glass but also including it in cocktails. We created several of our own Moscato cocktail recipes and continued to promote the wine as a by-the-glass or cocktail option when it was a North Coast Appellation bottling.

"Our Moscato was our only wine that was not 100% Estate and Napa Valley. We no longer purchase grapes and now all of our Muscat Canelli is grown at our Dollarhide Estate Vineyard in Napa Valley. This has resulted in a decline in production but a continued improvement in quality.

"The timing could have been better as the 2011 growing season brought the fourth highest rainfall in 40 years. The winter rains combined with significant rainfall in June during flowering, resulted in a significant reduction of crop yield. However, by late August and September, Napa Valley was warm which encouraged good ripening. Although overall yield was reduced, the grapes retained good concentration of flavor. The mostly cool growing season produced intense, rich Moscato.

Two of our largest national and corporate accounts are Morton's and Marriott hotels that sell our Moscato by-the-glass. Because of the small 2011 Moscato harvest, we have not been able to enter into any new corporate partnerships, but expect to continue the growth of these partnerships when the case production returns to larger volume. Typically we would sell about 25% at the winery, although in 2012, direct wine sales at the winery will be closer to 60% due to the short crop."

TECHNICAL NOTES

2011 Estate Moscato, Napa Valley
Alcohol: 11.0%
Acidity/pH: 0.85/3.10
Residual sugar: 6.3%
Dissolved CO_2: 1,300-1,400 mg/L

SUTTER HOME

Moscato was the first wine produced by Sutter Home Family Vineyards in St. Helena, CA more than 50 years ago from the Muscat grape – which is believed by many to be the ancestor from which most families within the Vitis vinifera grape variety descended. The Muscat grape has also been found to contain high concentrations of antioxidants.

Vinified from Muscat grapes grown near Madera and Fresno in the Central Valley of California, Sutter Home's sweet floral Moscato is "cap and drained" to increase varietal intensity, while maintaining crisp acidity.

As the Moscato trend continues to thrive, Sutter Home has added Pink Moscato, Bubbly Moscato, and Bubbly Pink Moscato to its portfolio, offering consumers more options to explore this distinct yet versatile variety.

"Moscato is a delicious, light and refreshing wine – especially for summer. It pairs well with fruit, light cheeses, sorbets and other desserts, or can be enjoyed on its own," says Wendy Nyberg, Senior Director of Marketing for Sutter Home. "Whether it is a formal dinner, a BBQ, or a pool party – this crowd pleaser is a perfect accompaniment to any event."

TECHNICAL NOTES

Appellation: California
Alcohol: 10%
Acidity/pH: 0.71 g/100ml/ 3.11
Residual sugar: 7.9 g/100ml

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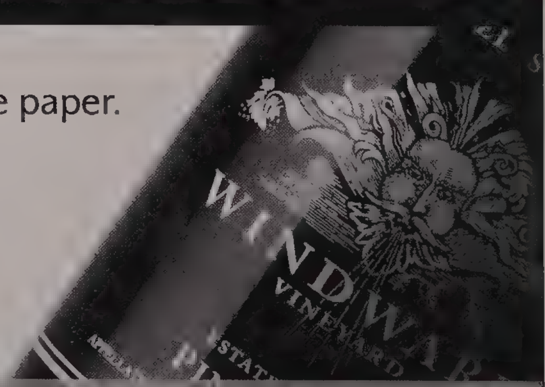

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TREASURY WINE ESTATES

Reduction in energy/water consumption

PWVJ staff report

Over the last four years, Treasury Wine Estates (TWE) has reduced its energy and water consumption by 20% in its wineries and facilities in California, and is pursuing a further 30% reduction over the next three years. "It is a key component of our sustainability plan, and part of our focus to meet our current needs without compromising the ability of future generations," says Scott Curwood, Senior Manager, Environment and Sustainability.

The team at the Asti winery (Cloverdale) is taking the lead to improve energy efficiency through projects such as a recent refrigeration upgrade. Floating head pressure controls were installed on the Asti ammonia system to allow the head pressure of the system to "float" with the changing outside air temperature. The head pressure will automatically adjust, based on the outside wet-bulb temperature instead of a higher fixed set-point pressure, which refrigeration systems are usually set at. The result of a lower head pressure, compared to a fixed head pressure, is that the compressor will require less power to provide the same amount of cooling to the winery, saving energy and money.

"The reduction in energy use combined with the rebates available through PG&E, made the project all the more attractive," says Jeff Collins, General Manager at Asti. "The rebates helped offset a good portion of the upgrade costs, and the payback is just a little more than twelve months for one system. It was a win for the environment, and for us economically."

The Asti winery and all other TWE facilities have made other improvements, including replacement of all metal halide and high-pressure sodium lights with T8 fluorescents, and 110 incandescent lights with CFL bulbs. TWE has used PG&E's "Savings By Design" program and the Wine Industry Efficiency Solutions program to achieve these results. Team Asti has been rewarded with over $500,000 in rebates. ■

New controllers were installed on two 200HP refrigeration compressors and insulation on ammonia piping.

New suction safety trap and transfer pump, Alfa Laval plate and frame glycol chiller, and 25° F ammonia system for cold stabilization at Asti.

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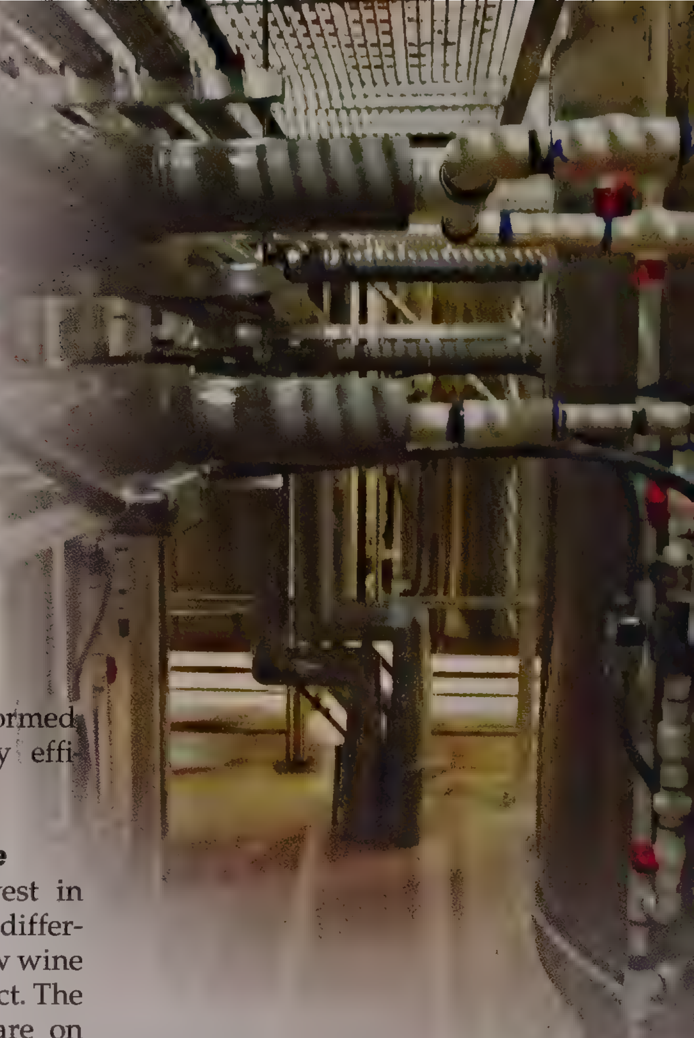
ENERGY EFFICIENCY: Examining the true cost of project delay

BY **Mike Corbett, Chris Pilek,**
Resource Solutions Group



Insulated glycol piping at Chateau Montelena, Calistoga, CA

Wineries need to keep a close watch on their operating expenses, while also seeking opportunities to create new revenue and maximize profits. Add the desire to increase sustainability, and it makes sense for winery operators to consider investing in energy efficiency projects to reduce operating costs and "green" their facilities and equipment. Energy efficiency is simply the process of accomplishing the same operational functions using less energy. Whether the potential project is a small pump motor replacement or a massive cooling system upgrade, there are some basic financial questions to address, such as:

- What will the project cost?
- How much money will it save?
- Where does the initial capital investment come from?
- How long will it take before the investment pays for itself, and increases the bottom line?
- What will be lost by not implementing this project?

Many times, even simple energy efficiency projects are delayed because the winery's financial manager – who controls the purse strings – hesitates to commit the required capital, or simply needs more information to determine if the project's return on investment truly "pencils out." What many financial managers forget to consider is that delaying energy efficiency projects can cost money. When this "cost of delay" is fully explored, the true financial value of taking immediate action on an energy efficiency project becomes evident.

By taking the time to get familiar with some basic financial concepts, winery management can learn to makermore accurate arguments for investing in energy efficiency. Using as an example a low-cost refrigeration upgrade, this article walks through how to use a Cost-of-Delay model[1] to make more informed, expedient choices about energy efficiency projects.

Turning savings into revenue

Conceptually, deciding to invest in energy efficiency upgrades is no different than deciding to develop a new wine blend or other value-added product. The same basic financial questions are on the table: How much capital is required? What is the expected return?

In the case of energy efficiency upgrades, the question often asked is: Which energy efficiency retrofit will yield the greatest energy savings? But the critical follow-up question that is often overlooked is: Can these energy savings be treated as a revenue opportunity?

Managing wasted energy can be a financial hedge against volatile energy prices. If the annual cost to operate inefficient equipment exceeds the calculated Annual Cost of Ownership (a term explained below) for new equipment, then moving forward with the project immediately is a sound financial decision. The Avoided Energy Cost – that is, the amount not paid to the utility company because the new equipment requires less energy – actually creates a new revenue opportunity for the winery.

Energy efficiency investments can be computed as "dollars per unit of energy saved" and then compared to the prevailing utility rate. As shown below, to compute this, simply divide the Annual Cost of Ownership by the annual units of energy saved.

This calculation allows winery managers and their counterparts in finance to make an apples-to-apples comparisons between multiple energy improvement investment strategies. They can then choose the investments that yield the greatest net revenue (the difference between the prevailing utility rate and the project cost per unit of energy saved), which allows them to increase operational revenues and thus increase the value of the winery.

Comparing cost of investment to cost of delay

Every investment has an opportunity cost associated with it; energy efficiency is no different. To assess capital improvement projects, financial managers typically factor in Simple Payback or Net Present Value to determine the overall project value. However, calculating the Cost-of-Delay is vital to helping winery managers assess the real value of efficiency, and how much they stand to lose by not taking action.

Financial metrics such as Net Present Value treat energy savings as future cash flows that are created by investing in new, more efficient equipment. This is correct; however the Net Present Value assumption does NOT take into account the value of the energy savings lost due to delaying a project's implementation. As a result of using the Net Present Value calculation, many wineries fail to invest immediately, and forfeit the revenue that could be recouped through avoided energy costs. Using the Cost-of-

Continued on page 74

CHATEAU MONTELENA energy efficiency upgrade

PWVJ staff report

Chateau Montelena (Calistoga, CA) incorporated energy efficiency measures into an upgrade and retrofit in 2011. "We enrolled in the Wine Industry Efficiency Solutions Program (WIES), which is sponsored by PG&E and administered by the Resource Solutions Group (RSG)," says assistant winemaker Matt Crafton. "We identified what was possible in our facility, and followed up with RSG to investigate potential rebates.

"Although PG&E did present their Savings By Design program as an option, and there is some overlap between the programs, we decided to stick with WIES as we had a strict design/build timeline to prepare for 2011 harvest. We had already identified many of the potential energy efficiency upgrades."

"A new high-efficiency custom chiller package was installed ahead of a full cellar renovation before the 2011 harvest," winemaker Cameron Parry reports. "With RSG, we looked at the cellar retrofit to see what else we were planning that would qualify for rebates. At that point, the two projects (chiller and cellar retrofit) merged into one rebate. Two variable frequency drives were added to the chiller skid that provides 15 tons of chilling capacity for red fermentors, and 10 tons of chilling capacity for white fermentors."

New chiller skid

Two separate glycol loops were installed; one exclusively for white wine fermentors needing cooler temperatures (28° F), and the other circulating warmer glycol to red wine fermentors (60° F) and using less energy.

PVC core pipes for glycol and hot water were insulated with an inner layer of one-inch P-20 CoraFoam material, a mylar vapor barrier middle layer, and a dark grey 20-mil jacket for the outer layer.

Energy-efficient, Title 24-compliant lighting includes T-5HO florescent work lights, some with dimmable ballasts, and Cree dimmable LED "show" lighting. Occupancy sensors maintain a minimum of light necessary (path lighting) when there is no active work in the cellar (foot traffic transiting the cellar only).

Another efficiency is advanced motor staging based on actual load on the chiller skid. Instead of one large motor sized to the biggest need a winery might have, and running even when the facility has low demand, there are four small motors that only run as needed. The units are integrated with a TankNet system that monitors demand, and activates units based on settings determined by the winemaking team for individual tanks.

A new heat recovery loop has refrigerant lines that send hot refrigerant through a heat exchanger to pre-heat winery hot water tanks, before going back, at a lower temperature, to the chiller for cooling. The glycol solution never gets that hot (maximum would be the same temperature as the hottest fermentation, about 85° F), but the refrigerant gets hot enough to be used to pre-heat water destined for the hot water heater. There is a temperature change in the incoming water (pre-heater water) of about 30° F to 40° F (coming in at 60° F and heating up to about 90° F to 100° F).

When the winery receives their annual PG&E energy statement in late 2012, they will see what their cost savings is on improvements made thus far, and determine if there are any items remaining on the energy efficiency list that are worth pursuing next. ■

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Cost of Delay

Continued from page 72

Delay model reveals the true costs of the missed opportunity.

Cost-of-Delay is the difference between **Avoided Energy Cost** and the **Annual Cost of Ownership,** which is based on each individual winery's cost of capital and economic life of the equipment. To illustrate this, let's examine a challenge faced by all wineries: how to effectively manage the escalating cost of refrigeration. Refrigeration accounts for the largest portion of a typical winery's energy costs, as much as 40% of the operating budget[3] Many winery managers are aware that they can avoid a significant amount of refrigeration energy waste by implementing a combination of three simple, low-cost projects:

- Insulating glycol storage tanks,
- Insulating glycol piping,
- Controlling pump motor speeds with a Variable Frequency Drive (VFD)

Even these relatively low-cost measures need investment capital and will undergo the standard financial merit tests before a purchase order is issued. Typically, this means the project must pass a Simple Payback test and have a positive Net Present Value based on the winery's Cost-of-Capital.

The problem with this approach is that capital improvements to operations are paid out of a separate budget, often requiring winery managers to wait until funds are available to purchase the proposed equipment. During the delay period, the winery will continue to incur operating losses from wasted energy, thus forfeiting a valuable revenue stream that would increase their bottom line.

Alternatively, the winery manager could use the Cost-of-Delay model to communicate the true financial value of each proposed project. Using this model, the winery manager could make the case that the Annual Cost of Ownership for the proposed equipment is already built into the operating budget. The following sample refrigeration proposal, typical of a small- to medium-size winery, demonstrates how a winery manager can effectively calculate the true Cost-of-Delay in order to implementing projects quickly.

Three Simple Steps

Using the information in Table I, the winery manager can determine what the winery's Cost-of-Delay will be in three simple steps:

Step 1: Determine the Avoided Energy Cost (Gross Annual Savings). In this example, the winery can expect to save $7,172 from operations annually (for this example, estimated 42,420 kWh of energy savings x electric rate of $0.169/kWh)[5]. Savings are estimated assuming that the winery has uninsulated glycol tanks, glycol pipes and no variable speed pump controls. The utility rate is typical of a California winery. A qualified Energy Efficiency advisor should be able to provide estimated annual energy

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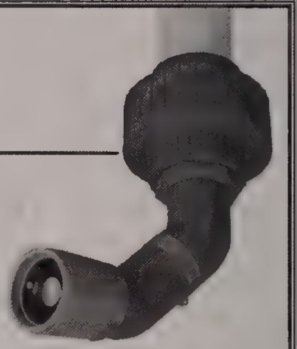

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Table I: Items for Determining the Cost of Delay

Project	Estimated Install Cost	Estimated Rebate[5]	Estimated Net Cost	Estimated Annual Savings	Estimated Energy Savings (kWh)
Glycol Tank Insulation (100 sq.ft.	$360	$175	$185	$372	2,200
Cold Glycol Pipe Insulation (200 ln. ft.)	$1,600	$720	$880	$1,170	6,920
Glycol Pump VFD (1.5 HP)	$6,700	$2,500	$3,100	$5,630	33,300
Total Combined Project	$8,660	$3,395	$4,165	$7,172	42,420
Cost of Capital (i)	10%				
Economic Life (years) (n)	5				
Utility Rate	$0.169/kWh				
Capital Recovery Factor	0.2638				

savings for the type of project under consideration.

Step 2: Determine the Annual Cost of Ownership. The Annual Cost of Ownership is calculated by multiplying the Net Project Cost by a Capital Recovery Factor (CRF). In this example, the project's gross installation costs are offset by rebates provided by the utility, resulting in a lower net project cost.

CRF= j(1+j)^n / [(1+j)^n] -14

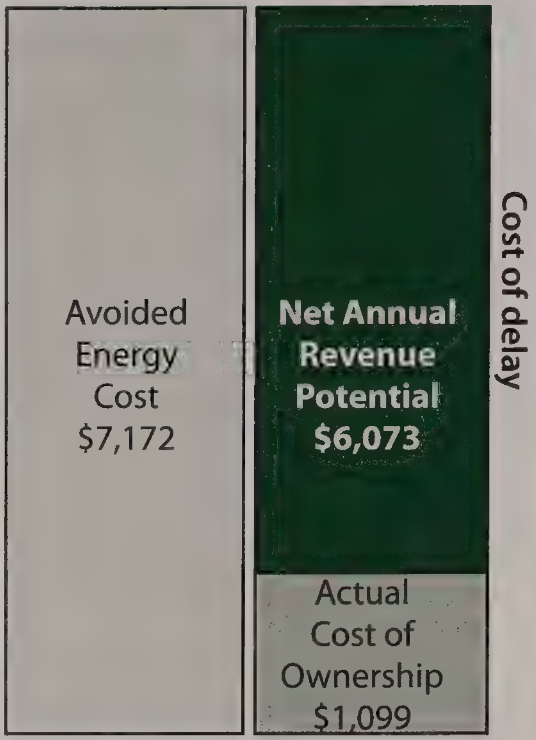
Where CRF = Capital Recovery Factor
j = Cost-of-Capital plus additional cost considerations
n = number of payment years (economic life of the project)

In our example, CRF = 0.2638

Annual Cost of Ownership = Net Project Cost x CRF

In our example, Annual Cost of Ownership = $4,165 x 0.2638 = $1,099

To put it another way, the Annual



Cost of Ownership is the amount of fixed costs – the annual cost of bor-

Continued on page 77

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JACKSON FAMILY WINES

Solar cogeneration array installation

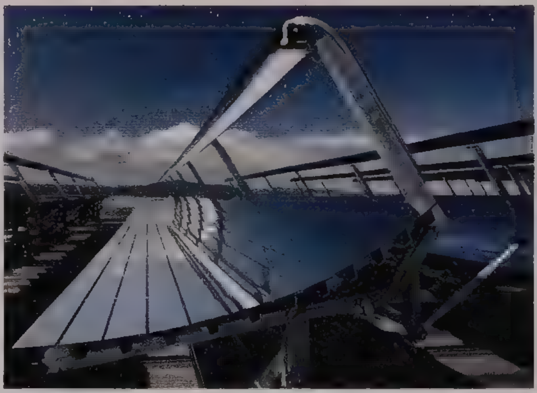
PWVJ staff report

Jackson Family Wines began operation of a 241 kW solar cogeneration array in January 2012 that can produce 4,200 gallons of hot water per day for cleaning blending tanks and sterilizing two bottling lines at its Kittyhawk facility (Santa Rosa, CA).

After examining several renewable energy solutions, such as traditional solar electricity and solar hot water, Kendall-Jackson decided on solar cogeneration (a combined system providing both renewable electricity and heat for hot water generation). In addition to the unique benefit of dual energy production, Kendall-Jackson chose solar cogeneration for its quick payback (under five years) and simple integration into existing infrastructure.

There are 96 Cogenra PVT (photovoltaic-thermal) modules to supply approximately 1.4 million gallons of hot water annually. SunWater Solar installed the Cogenra turn-key system in late 2011, now spanning more than 9,000 square feet on the roof of the Kittyhawk facility.

The array concentrates sunlight on solar cells producing electricity and waste heat, the same way traditional photovoltaic systems work. Cogenra then captures the waste heat and uses it to heat a water/glycol solution, which is fed to heat exchangers producing 140°F water that is increased to 180°F by a boiler. The 1.4 million gallons of hot water per year is approximately 60% of the demand of one wine-blending building and the bottling building.



One challenge with traditional photovoltaic (PV) systems is that only 15% of the sun's energy is converted into useable electricity, meaning 85% of the sun's energy is wasted, mostly in the form of heat. The Cogenra team found a way to harness this lost resource, capturing the waste heat created during electricity generation and using it to produce hot water. As a result, Cogenra's hybrid solar technology uses up to 75% of the sun's delivered energy, producing five times more energy and three times more greenhouse gas reductions than traditional PV panels.

"We use that hot water to supply our boiler, which heats it to our preferred temperature of 180°F," explains Robert Boller, Kendall-Jackson's Vice President of Sustainability

"What is exciting for us is the energy conservation that comes from the cogeneration system heating the water. Previously we used a boiler to heat water from 60° to 180°, a 120° difference. With the cogeneration system we only need to heat it from 140° to 180°, a 40° difference. This is important because we are able to conserve on energy and burn less fuel in order to bring the water up to the proper temperature. Reducing the amount of fuel we burn to heat hot water is very important to us. We are essentially bottling a food product and sanitization requires a lot of hot (180°) water."

The new array generates enough hot water to wash seven, 15,000-gallon tanks and one 100,000-gallon tank daily, and feeds electricity to the building's grid to power lighting and cooling systems. The Cogenra array combines PVT panels, fully integrated hydronics, tracking controls, and inverter in one system.

Kendall-Jackson has seen a positive financial impact on their energy bill, and will save nearly $30,000 per year on energy expenses. While solar energy production will vary by seasons, the array will provide an average of 60% of the facility's hot water needs annually.

Kendall-Jackson chose to purchase the system, and is taking advantage of the state's solar thermal rebates, which under the California Solar Initiative, will pay back $12.82 for each therm displaced during the first year of operation.

"We are thrilled to take this leadership position with Cogenra by installing the largest rooftop solar electricity and hot water system to date, and two upcoming installations at our Vinwood (Alexander Valley) and Soledad facilities which will make us the largest user of solar cogeneration is the U.S." concludes Boller. ■

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CONSTELLATION BRANDS

Energy-saving refrigeration

PWVJ staff report

Mission Bell Winery (Madera, CA) is part of Constellation Brands, Inc., the world's leading premium wine company. Located in the central San Joaquin Valley, the winery is a large producer of wine, grape juice concentrate, and other grape products.

In 2010, Global Energy Partners, LLC conducted a comprehensive energy study at the winery as part of the Pacific Gas & Electric Retrocommissioning Energy Incentive program. The study revealed that the winery's refrigeration systems are the largest users of electricity in the winery, and recommendations were made to improve the systems by changing the existing fixed ammonia compressor discharge pressure to a floating head pressure control.

In floating head pressure control, the compressors' discharge head pressure varies, or "floats," with the outside wet-bulb temperatures – allowing the ammonia pressure to better match the refrigeration demand. This is similar to installing a variable frequency drive on a pump.

The strategic fit of this project is consistent with Constellation's commitment to reduce its carbon footprint and positively impact Constellation's Corporate Social Responsibility (CSR) goals. Furthermore, this project will conservatively save 1,525,725 kWh per year of energy and $143,000 annually in reduced energy costs, and also qualifies for a rebate incentive. ■

Cost of Delay

continued from page 75

rowing capital and maintenance costs of owning a piece of equipment – that a winery can expect to pay each year for the economic life of the equipment. In this example, the winery will only incur an Annual Cost of Ownership for five years of the project's life. After year 5, the winery will benefit from the entire Gross Annual Savings achieved through the retrofit for the remainder of the equipment's useful life.

Step 3: Determine the Annual Cost-of-Delay. The Annual Cost-of-Delay is calculated by subtracting the Annual Cost of Ownership from the Avoided Energy Cost.

Annual Cost-of-Delay =
$7,172 - $1,099 = $6,073/year

Delaying this simple refrigeration project for one year could cost the winery $6,073 in potential revenue. The Annual Cost-of-Delay will continue to accrue as a lost revenue opportunity for the winery until action is taken to exploit it. As energy prices remain volatile, the potential for energy prices to increase poses a significant threat to every company's bottom line.

Through investments in energy efficiency upgrades, winery managers can minimize the impact that energy prices have on the bottom-line. In the example shown above, a typical small- to medium-size winery can shield itself from over 75% percent of the energy risk associated with operating equipment inefficiently.

By demonstrating the value created through these types of low-cost projects with the Cost-of-Delay model, winery managers will have an easier time making the case to implement even larger projects and new energy efficiency technologies. Energy efficiency projects will remain a low priority in the capital improvement budget unless winery managers place an emphasis on the revenue opportunity lost through delayed investment. By quantifying the true Annual Cost-of-Delay, winery managers can easily prioritize energy efficiency in the capital budget, increase the winery's bottom line, and reduce the winery's exposure to future volatile energy prices. ■

About Cost of Delay Authors

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Footnotes/References

1. The Cost-of-Delay model described here is based on concepts and methodologies presented by Christopher Russell in his book, Managing Energy from the Top Down: Connecting Industrial Energy Efficiency to Business Performance, Chapter 6 "How Does the Money Work."
2. Russell, C. 2010 Managing Energy from the Top Down: Connecting Industrial Energy Efficiency to Business Performance. Lilburn, GA: The Fairmont Press, Inc.
3. California Institute of Food & Agricultural Research. Technology Roadmap: Energy Efficiency in California's Food Industry, July 2006. CEC-500-2006-073, page 8, Table 5, "Estimated distribution of energy (%) within major food processing sectors in California."
4. Initial cost, salvage value, and projected revenues factor into a capital recovery analysis when a company is determining whether and at what cost to purchase an asset or invest in a new project. http://www.investopedia.com/terms/c/capital-recovery.asp#ixzz1numtqEO0
5. Resource Solutions Group & Pacific Gas and Electric Workpapers

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Part II: IN-DEPTH LOOK AT

John Gladstones' Wine, Terroir & Climate Change

Review by Brian Croser, TapaNappa Wines, Australia

Gladstones explains the ideal rainfall pattern and soil moisture response to achieve the best growth and ripening response from the root-derived hormones through the growing season (page 29). This is followed by a discussion of the limitations of, and the best strategies for irrigation in irrigation-dependent climates (pages 65-67).

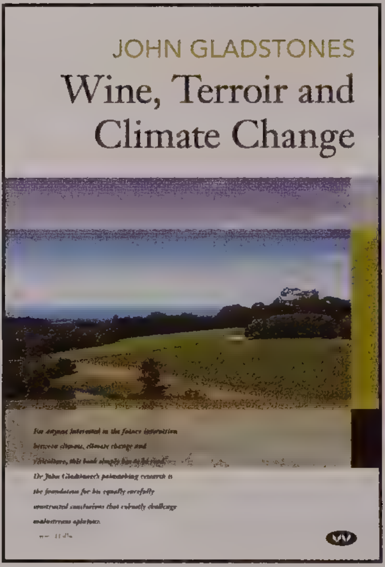
The successful application of irrigation to achieve best quality depends on a "reliable enough wetting of the full soil profile in Winter/Spring," which allows the vine "to develop a fully comprehensive root system – which taps moisture to depth. ... a heavy supplementary watering in winter or early spring may successfully mimic" the ideal winter-spring rainfall pattern. This is an important contribution to irrigation strategy in the globe's many irrigation- dependent vineyards.

Gladstones examines the potential role of partial rootzone drying (PRD) in management of post-flowering irrigation (page 66). The precarious moisture balance of the post-veraison ripening period requires enough soil moisture stress to keep the abscisic acid flowing from healthy roots and not so much stress that the roots lose activity and the canopy suffers desiccation as transpiration from the leaves exceeds water uptake by the roots.

Gladstones' hypothesis about the controlling role of the roots in the ripening process is not so controversial, more an insightful synthesis of established scientific observation into vine and terroir logic.

More controversial is his hypothesis about the role of roots in defining grape and wine composition and quality that extends to the defining role of roots and the influence of geology on grape and wine mineral composition. The mineral composition of wine is a signature of its origin and, he speculates, must therefore relate to the unchanging base geology as opposed to the more dynamic mineral status of the soil (pages 86-87).

The hypothesis of the role of geology in determining the mineral composition of wine relies on the vine root system extending down to the parent rock material and the vine's xylem system becoming the main conduit for hormones and minerals after the phloem has closed down, from the roots to the ripening grapes late in the ripening process when the vine is dependent on deep moisture reserves. Some of these minerals are important as cofactors in the enzymes responsible for the synthesis of color and flavor compounds in the grape.


JOHN GLADSTONES
Wine, Terroir and Climate Change

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For Gladstones, this hypothesis explains the widely empirically observed but not scientifically proven assertion of soil and geology's major role in site terroir expression.

Gladstones' hypothesis about late-ripening varieties

The hormone control of grape ripening is largely but not exclusively root-generated. In cool, humid soil, high-latitude environments, the rapidly decreasing day length and temperature in the late autumn trigger abscisic acid production from the leaves which serves the same grape-ripening stimulus as root-derived abscisic acid.

The developing seeds of the berries after flowering and fruit set contribute a hormone class called auxins. The main role of the auxins is to delay the ripening effects of abscisic acid until the embryos in the seeds are fully developed, a logical result of natural selection (page 55).

In describing the "Maturity rankings of grape varieties" (Chapter 10), Gladstones recognizes that the difference in the time of bud burst between varieties is significant but that the main difference in harvest time between maturity groups is created by the length of "phase 2, the lag phase" of berry development, the time between fruit set and veraison (page 102).

This is the period when seed-produced auxin is holding off the final ripening effects of abscisic acid. The differences between varieties in this phase are largely responsible for harvest-date differences.

Tannin synthesis in berries finishes at veraison so the later-ripening varieties with longer lag phases have more time to build up tannin content, an observation supported by the generally higher tannins of late-maturing varieties (page 105).

Implications of the Gladstones' hypotheses

Adopted slavishly, Gladstones hypotheses would guide site selection only to higher latitudes or at lower latitudes in cool, foggy, low-rainfall maritime environments, with narrow daily temperature range and low temperature variability. The ideal vineyard would be on a moderately steep north-east slope with its back to the prevailing winds at an altitude of 200 to 300 meters (southern hemisphere).

The soil would be dark or red in color to absorb sunlight heat and re-radiate it at night. It would have a high incidence of rock at the surface and throughout the profile for the best heat transfer to the vine's deep roots. The soil could be a duplex soil with a deep reserve tank of tightly moisture-holding clay and a free-draining, moderate fertility top soil or alternatively a free-draining top soil over a deep layer of water-holding limestone.

The Winter-Spring rainfall of the selected site would be sufficient to fully charge the soil profile but allowing the vine to deplete soil moisture by mid-summer and stop growth before veraison. Then, small supplements of summer rain, the deep subsoil and underlying geology must provide barely sufficient moisture to achieve ripening with mild stress on the roots but not so much as to cause leaf senescence.

There are obviously many fine terroirs around the globe that do not fully answer these criteria and especially many that have large daily temperature ranges (Mendoza in Argentina and Maipo in Chile). Such sites work because of the total absence of rain in the late Autumn allowing the grapes to fully ripen despite the night temperature inhibition of phenological development and ripening.

Gladstones's masterly work allows an understanding of the reasons why the exceptions work and the terroir mechanisms of those sites defined by his courageous hypotheses with ideal environmental criterea.

Wine, Terroir and Climate Change has, more than any other modern viticultural treatise, consolidated and made sense of my viticultural experience and logic framework, gained from my life's work as a vigneron. In my estimation, *Wine, Terroir and Climate Change* sits alongside Dr. A.C. Kelly's classic 1867 publication, *Winegrowing in Australia*, as a significant contribution to viticultural thinking and practice.

John Gladstones has constructed a wonderful new book, Wine Terroir and Climate Change to examine the effect of each element of terroir (the environment) on the stages of growth and fruit ripening of the grapevine. He has proposed hypotheses around the vine

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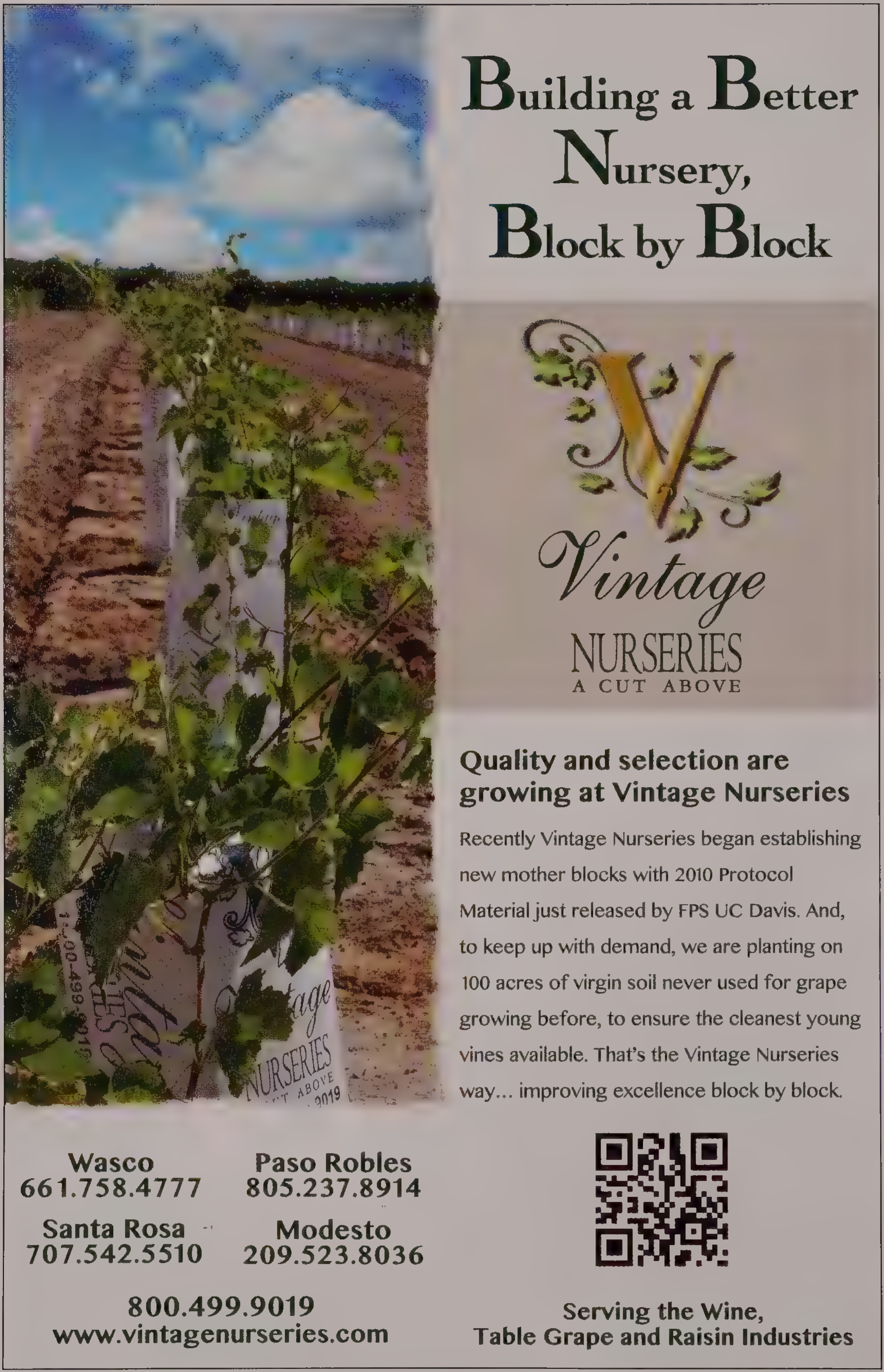
physiological responses to these terroir signals and the ultimate effect on grape composition and wine quality and style.

His chapters sequentially look at the effect on the vine of; atmospheric temperature and all of the other climate components; the geography, topography and soil; and geology of the terroir. The book is largely constructed as an examination of the logic of terroir. It is terroir-centric.

In Part I of my review, I tried to tease out of each chapter the vine physiological response as the central theme. Instead of looking at the atmospheric temperature affect on all components and phases of vine physiology, I tried to look at an aspect or phase of vine physiology such as fruit ripening and attempted to summarize the effect of all of the terroir components on that physiological process.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The first review was directed at vine-logic rather than terroir-logic. It is vine-centric. There is one very important vine physiological response to terroir that was not included in the first review. The missing physiological response is the formation and retention of aroma and flavor compounds in grapes and their expression in wine, which is at the very core of wine quality.

When I wrote Part I, I had difficulty to extract Gladstones's flavor formation and retention hypothesis from the many places flavor development was mentioned in the book.

Throughout the book, Gladstones attempts to explain those environmental and genetic factors at work in the biosynthesis of the tertiary compounds at the core of grape flavor. Further, he examines the environmental influences involved in the wine quality defining balance of the retention of these aroma and flavor compounds in the grape and their potential loss by vaporization and chemical degradation. Finally, he speculates about the role of these compounds in wine style and quality and the circumstance of appreciation of different wine styles.

Formation and retention of grape flavor and phenols

Pervasive throughout the book are references to the author's hypotheses about grape flavor formation and perhaps of equal importance to wine style and quality, the optimal environmental conditions required to retain those flavors in the berries and their transfer into wine.

Gladstones refers to the "non sugar ripening process" which he defines as, "The biosynthesis and storage of aroma and flavor compounds (engustment), loss of malic acid and other acids; continued skin anthocyanin synthesis in red varieties; loss of herbaceous aromas and flavors and, very important, the maturation of tannins in seeds, skins, and cluster stems." (page 54).

A central argument of the book is that regional/site differences in heat summation and temperature equability largely define site suitability for varieties of different maturation groups. He identifies the climate regime of the last 30 days of the ripening period as the most influential for the production and retention of aroma and flavor compounds and the polymerization and extractability of the phenols of the skins and seeds (page 20).

Climate is not the only terroir attribute at play in the last 30 days of ripening. As discussed in the first review, the role of abscisic acid is essential to the continuity of the ripening process and the synthesis of these tertiary aroma and flavor compounds. Responding directly to soil environmental conditions, the roots are the main source of abscisic acid (page 54).

However, the quantum and quality of the tertiary aroma and flavor compounds synthesized is profoundly influenced by atmospheric temperature. Gladstones identifies the optimal mean temperature of the last 30 days of ripening for the synthesis of flavor and pigment in red varieties as 18° to 22°C and for the best attributes of delicate white and sparkling wines the mean can be as low as 12° to 15°C (page 20). In Table 3.1 (page 36) he summarizes the ideal temperature regime, sunshine hours, rainfall, and afternoon humidity for the final 30 days of ripening for different wine styles ranging from sparkling wines, through light, medium, and full-bodied table wines and fortified wines.

The synthesis of the volatile aroma and flavor compounds is optimized when the abscisic acid ripening signal is strong, the light is diffused by clouds or the low sun angle at high latitude to maximize photosynthesis without harmful radiation heating, the day temperature is cool, the night temperature is warm, and the afternoon humidity is moderate to high to restrict transpiration. He argues these narrow daily temperature range attributes are characteristic of the great terroirs (pages 38-39).

Gladstones' argument for the importance of the temperature equability (narrow daily temperature range) of a site, feeds into the aroma and flavor story. Low day temperatures at moderate humidity favor the direct synthesis of these aroma and flavor compounds and the accumulation of sugars as starch during the day. At night, the surplus assimilate is translocated to the berries as sugar, the substrate for aroma, flavor, and phenol formation during the warm nights. The warm nights of temperature equable sites potentially allow 24-hour synthesis of aroma, flavor, and phenols essential to wine quality (page 26).

Flavor formed in the berry skins at night has the least possibility of evaporative loss and the maximum possibility of being conjugated with sugar and transported to the interior of the berry where it is protected against degradation and evaporation (page47). Importantly the moderate-cool day temperatures of temperature equable sites also limit the evaporative loss of volatile aromas.

Significantly, Gladstones introduces this new hypothesis that the low boiling point aroma compounds of grapes are

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volatilized from the berries at elevated temperatures and in the case of very high berry temperatures they are chemically degraded. He uses the measured monoterpene loss from the leaves of forest trees and its exponential response to temperature to justify his berry aroma evaporation hypothesis in the absence of direct grape experimental evidence (page 20). Aroma and flavor evaporation from berries is a concept, which carries throughout the book.

The flavor story that Gladstones weaves is complex. He explores the well-established science of volatile aroma compounds (terpenes) being trapped in berries by their conjugation with sugar into non-aromatic and non-volatile form and for thiols which are important to Sauvignon Blanc and the Cabernet family aroma, their conjugation with the amino acid cysteine achieves the same result (page 21). Thus the carbohydrate (sugars) and the nitrogen (cysteine) economies of the vine become important in retaining synthesized aromas and flavors, their conjugation protecting them from loss by evaporation.

The terpene glycosides undergo hydrolysis late in ripening and in fermentation to re-release the aromas and thiols are released as aroma from cysteine bondage during fermentation allowing expression of these latent volatile aromas in the finished wine (page 21).

The importance of moderate-cool bunch temperature to the retention of volatile aromas is contrasted with the evaporative loss of berry aromatics and the "dead fruit" character of berry shrivel which is caused by abnormal heat stress during final engustment (page 24).

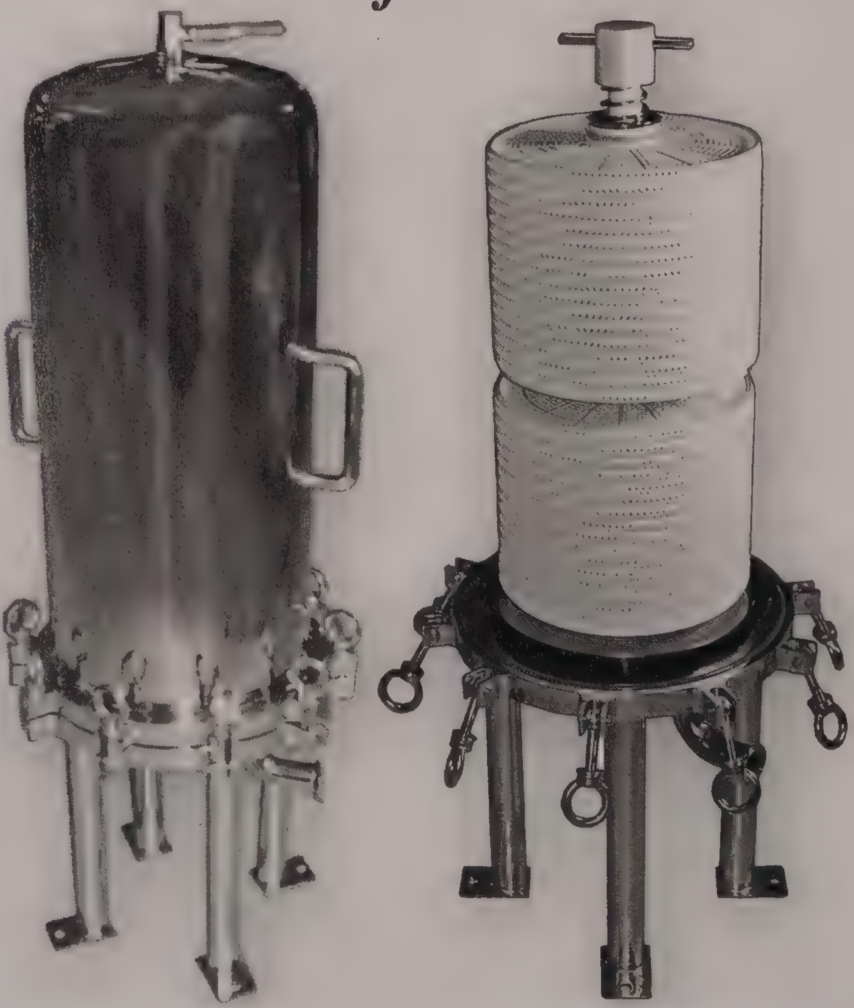
The incidence of strong sunlight directly onto clusters creates an accumulative heating effect because of cluster geometry and the low number of transpiring stomates on berries which can raise berry temperatures 12° to 15° C above ambient temperature. This effect is especially accentuated in black-skin grapes and results in loss of volatile aromas (page 27).

Paralleling the volatile aroma and flavor story is the formation of tannins and color (anthocyanins) in the ripening berry.

As discussed in the previous review, the maximum amount of phenol has formed in the berry by the end of the lag phase of berry development (page 104). The lag phase is the period before veraison in which seed development is completed under the control of auxin (page 102). The length of the lag phase largely defines whether a variety is early or late ripening (page 103).

In late ripening varieties, Gladstones hypothesizes that the long lag phase allows the accumulation of more tannin and color (anthocyanin) than in early maturing varieties. This fits with universal observation that later ripening Cabernet Sauvignon has more color and tannin than early ripening Pinot Noir (pages 106-107).

He argues, "early maturing varieties, phenologically adapted to short and cool climates ripen best under cool conditions." (page 110)



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The short, cool ripening season of early maturing varieties allows for maximum retention of the low boiling point aromas and flavors and restricts the development of tannin astringency and bitterness. The prolonged lag phase and ripening season of late ripening varieties in warm climates allows the volatilization of the low boiling point aromatics and the accumulation of higher boiling point aromatics and astringent tannins (page 106).

On the much discussed subject of tannin maturity, Gladstones hypothesizes that achieving tannin maturity is a result of a reduction in the total amount of tannin which can be extracted from the berry after veraison.

There is a larger reduction of the extractability of the smaller molecular weight tannins (catechins) in the seeds due to seed hardening than the larger molecular weight polymers (flavonols) from the skins. The catechins are responsible for bitterness and the flavonols for astringency, so the overall organoleptic effect is a softening of total tannin astringency and the disappearance of bitterness (pages 104-106). Early ripening varieties have less of all tannins but especially those causing bitterness.

Finally Gladstones speculates on what he calls "the ecology of winemaking and drinking" (page 110). To paraphrase this concept, wines made from early ripening varieties in cool regions are aromatic, relatively high in acid and low in tannins. Grape composition is responsible for these wine characteristics but also the low fermentation temperature in the cool autumn/winter of cool regions preserves and enhances these aromatic qualities.

Gladstones extends the argument to what he terms, "the co-adaptation in grape-growing, winemaking, and wine drinking," beyond the grape and fermentation. "to the regional perceptions of wine style and quality."

He makes the case that the northern European people and cultures naturally value the cool climate wine styles as the best terroir expressions of their regions. These wines are usually consumed cold to optimize the expression of the low boiling point volatile aromas and flavors.

By contrast, Gladstones attributes the room temperature consumption of the natural wines of late-maturing varieties and warmer areas, to the need to "bring up the high boiling point aromatics that have survived warm ripening and fermentation and soften the perception of high tannins." (page 110).

Brian Croser's conclusion

Comparing and contrasting the preference of the northern Germanic wine growing regions and cultures for aromatic, low tannin, predominantly white wines with their Gallic neighbor's preference for earthy-flavored, high tannin mainly red wines it can be inferred that vine terroir has imprinted on human preference and culture, not as is sometimes claimed the other way around.■

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Editied from first publication in THE CRUSH, May 2012,

California Association of Winegrape Growers

Many winegrape growers, like their counterparts throughout the agricultural sector, are unprepared on the proper protocol to follow if they receive a visit from a state or federal official empowered to inspect and enforce the various agricultural laws and regulations.

Be prepared

Not having a plan in place to handle scheduled, or even unannounced, visits by agency officials dealing with such things as labor, air and water quality, or Endangered Species Act regulations, could result in a bad outcome for the property-owner.

Advance planning is a very important pre-emptive move, according to attorneys who specialize in representing growers in these situations. Being prepared is being forewarned and a favorable outcome for any of these visits improves dramatically if the grower, and his employees, are familiar with the various laws on the books, including regulations that growers believe may not be applicable in their situation.

Bill Pauli, a Mendocino County winegrape grower and chairman of the board of the California Association of Winegrape Growers, says there are two very important things in these planned or surprise visit scenarios — be in compliance and have documentation on hand to support it.

"You are better off to assume that they are going to show up. That way you are totally prepared and not surprised when they do. You know what they are going to ask for. You know what documents you need to have," Pauli says.

Control access

Kurt Gollnick, chief operating officer at Scheid Vineyards (Greenfield, CA), notes that growers should control access by installing gates and enforcing closure rules.

"Install signs on gates or other entrances that clearly state that No Visitors Allowed and then do not allow visitors," Gollnick says. "For example, do not allow food trucks to enter with meals and then deny access to someone else. You could face discrimination charges."

When agency officials attempt to come onto vineyard property, Gollnick has instructed his foremen and supervisors to examine credentials and get a business card from each agency official.

"If the agency officials can't provide

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that evidence, then ask them to leave. I instruct my employees to always immediately call their supervisor and report that there is a government visitor," he advises.

Have a response policy

Diane Kindermann of Abbott & Kindermann, LLP, a Sacramento-based law firm specializing in environmental, land use and real estate law, has observed that there are four general situations where the question of agency inspections and access arise in the environmental context:

- Unannounced and authorized per an existing permit (not very common).
- Unannounced and not in accordance with any permit. This is likely associated with an alleged violation. 'Tell them politely that you are in the middle of something and ask them nicely to return at a scheduled time, unless they have a warrant. If they have a warrant, allow access and say almost nothing, take copious notes and ask cautious, narrow questions.'
- A planned visit, in which case the grower needs to be prepared to respond to the purpose of the visit.
- Access associated with a conservation or mitigation plan related to resources on the landowner's property and the landowner is already participating in the plan, or is being asked to participate in it in the future. There should be a restrictive access agreement in place narrowly defining who, what, where, when, and how in relation to that access.

"Generally speaking, having a policy in place is advisable and will reduce employee errors in dealing with unannounced situations. It will assist employees in dealing with an announced agency visit as well," she adds. "The overall goal of having a response policy is to keep the issues in question from rising to the level of a permit or other type of violation or worse yet, a criminal proceeding."

Kindermann further recommends that

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a written, comprehensive Regulatory Response Policy needs procedures for the following:

- Routine inspections (if any) and unannounced inspections, with or without a warrant.
- Written information requests from regulators.
- Who will be your lead contact and backup personnel for regulatory responses and site visits.
- Document and data marshaling, control and retention during investigation. A blackout policy on employee discussion of anything at work including the regulatory visit. (This includes use of social media).
- What employees should do if approached by a regulator, either at work or outside of work, or if a regulator asks a manager to interview employees.
- Documenting or recording the regulatory personnel's site visit.
- Understanding what "obstruction of justice" means (mostly relevant to a search warrant scenario).
- Notification of facility or landowner's third party consultants.
- Establishment of recurring Regulatory Response training.

Stay calm and be polite

Attorney Michael Saqui (Saqui Law Group), practices labor law and has prepared a multi-page "Agency Compliance Protocol" to assist growers in dealing with visits by regulatory agencies and others. The protocol is very specific as far as providing the grower with the proper "do's and don'ts" to prevent a visit from escalating into a bad situation.

"Stay calm and be polite no matter how you feel," he says. "Losing your temper will only make matters worse. Offer the agent coffee or donuts if available. Do not refuse or delay providing documents you are legally required to provide, but remember that you can ask for time to compile the records requested by agents. Do not allow documents to be removed from your property without making copies, and do not turn over more documents than the law requires."

Saqui notes that growers need to know their rights – if a government agency shows up, no one is required to answer any questions.

"Make sure you consult with your attorney before giving agents access to employees or management, or before allowing any press contacts," adds Saqui. "Also, you have the right to continue operating your business during the government agency visits.

Saqui describes one area of confusion and concern among growers is raids by U.S. Immigrations and Customs Enforcement, commonly referred to as ICE raids. Such raids do not require advance notice, but employers do have certain rights.

For example, an ICE raid requires a search warrant with those notable exceptions – within 25 miles of the U.S. border; if the grower or his agent gives consent; if the government is in hot pursuit of an undocumented alien; or if the land is not being used for agricultural purposes, in which case no warrant is required.

During a raid, the grower or his representative may accompany the ICE officers on their search.

"Always take notes on everything that is occurring," adds Saqui. "Make note if any unusual or disturbing behavior occurs, such as badgering of employees or questioning only foreign-appearing employees. Do not do anything that could get you into more trouble. Do not hide employees, advise them to run or hide or help them escape from the premises."

The I-9 Audit is another tactic employed by ICE officers, during which they demand to see the employer's I-9 employee eligibility verification forms that certify that an employee is in the U.S. legally.

"An I-9 Audit requires three days' advance notice in writing – even if the audit is part of a DOL drop-in inspection," Saqui says. "Always demand three days' notice before showing anyone the I-9s. Sometimes, ICE agents will present a subpoena (in conjunction with an audit), suggesting that you need to comply with it immediately. ICE cannot use a subpoena to shortcut the three-day notice period."

In summing up, Saqui offers the following advice: "Remember that the only person who acts in your behalf is the person that you retained to represent your interests. You have to trust those advisors and in the face of an investigation, it is worth spending the money to get your lawyer on the line to talk you through what could be something that could amount to tens if not hundreds of thousands of dollars in fines."

Growers who prepare in advance of an agency visit to their vineyard can receive assistance from such entities as the Farm Employers Labor Service (FELS) at www.fels.net; Saqui Law Group at www.laborcounselors.com; and Abbott & Kindermann at www.aklandlaw.com. ■

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SMART VITICULTURE *by Dr. Richard Smart*

Scorecard on almost 50 years of progress

Since my first grape harvest in 1965, working as a young and inexperienced researcher in vineyard irrigation in the Australian equivalent of the Fresno, California region, I have made 47 harvests, and seen many changes. For this column, I thought I would reflect on how things have changed in vineyards, and in the minds of viticulturists for this almost five-decade period. Further, I will reflect on some changes for the worse, and some changes that perhaps should have occurred, but have not.

Some changes for the better

One of the greatest changes has been the advent of drip irrigation. Coincidentally, this was part of my early research, and I made a visit to Israel in 1970 to study this new technology. Few technologies have made a greater impact on viticulture. Consider the dramatic increase in vineyard plantings on a wide range of landforms that were made possible by this new technique, and the concomitant savings in water and nutrient application.

Another major advance has been in planting material. This has come about through clonal selection (especially in Europe) and virus detection and elimination (especially in California). Now both techniques are appreciated and integrated, and today new vineyards can be planted with the best standard planting material ever in the history of viticulture. Here, however, I add an important caveat: the emerging problems of trunk-disease infected planting material need to be addressed.

Another major advance of this period has been in research about and commercial adoption of canopy management in vineyards. This has been an important technology, offering opportunities to manipulate yield and improve wine quality and reduce some disease impact. Adoption has not been universal; I think that the most have been in the U.S. There seems to have been little impact in Europe and Australia; the latter where considerations of cost minimization have hindered adoption.

Increased vineyard mechanization has also been a major feature of this period. Tractors, cultivators, and spray machines were present after World War II, but pruning and harvesting were major vineyard activities requiring labor.

I recall, as a Cornell graduate student in the early 1970s, seeing early versions of mechanical harvesters, mechanical pruners, and mechanical shoot positioners at the Geneva Experiment Station, developed by engineer Stan Shepherd

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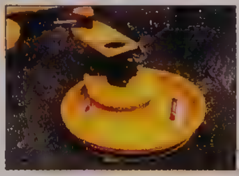

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for the then-new Geneva Double Curtain trellis, which had previously been developed by his colleague (and my mentor) Professor Nelson Shaulis. From these humble beginnings have emerged today's vineyard machines, but I must say that mechanization of shoot positioning has progressed little.

Especially with developments in mechanical harvesting, the face of viticulture has changed forever. However, even modern mechanical pruners cannot control bud numbers retained at pruning as easily as by hand. The emerging application of robotics, though, may yet make mechanically pruned vines more resemble vines pruned by hand.

GOOD THINGS

- ✓ Irrigation
- ✓ Clonal selection
- ✓ Virus freedom
- ✓ Canopy management
- ✓ Mechanization – pruning, harvesting, leaf removal, trimming (hedging)
- ✓ IPM
- ✓ Agricultural chemicals (particularly herbicides), registration, environmental awareness
- ✓ Better communication, education, training, computing
- ✓ Monitoring, IR, instruments
- ✓ Reduction in cultivation

THINGS NOT DONE

- ✓ Other grape varieties
- ✓ More breeding of grapes and vines?
- ✓ Value of grapes!!!!!!
- ✓ Concern for compaction, rationalization of organic production
- ✓ Valuing viticultural impacts on wine quality

BAD THINGS

- ✓ Biodynamic growing
- ✓ Chemophobia
- ✓ Mythology, resistance to progress: i.e. early days of mechanized harvesting and pruning
- ✓ Failure to accept new varieties
- ✓ Using too heavy, too powerful machinery
- ✓ Emphasis on economics, cost of production (Australia)

Agricultural chemicals used in viticulture have also changed and improved over this period. The introduction of herbicides had a major impact, especially with management of young vines. There has certainly been a dramatic change in attitude about the environmental impact of chemicals used in agriculture, a far cry from the early days of their use about which Rachel Carson raised the alarm in her classic book, *Silent Spring*.

Modern agricultural chemicals must undergo strict testing for environmental and health impact, as well as efficacy on target organisms. This process is so expensive for manufacturers that not all chemicals are registered in all countries, especially where the market is small. Further, the same concern for environmental and health issues has seen some chemicals removed from the market.

I am very pleased to acknowledge that some researchers, especially in California, are becoming concerned about the impact of viticulture, winemaking, and wine sales on atmospheric carbon dioxide, which is part of a global concern of agriculture and manufacturing.

Education and extension programs have also changed dramatically over this period. In Australia, for example, there have been new university-level courses developed, and in most countries and regions there are more trained viticulturists and enologists than at any previous time. Further, most wine regions have local grower and winery associations, and especially with widespread use of the Internet, news and information is readily disseminated.

Instrumentation has also rapidly changed over this period. This has been especially evident for wine analysis, but the same has happened also in vineyards. Weather stations are now quite common, as are instruments to measure soil moisture, both of which facilitate vineyard management.

Another development has been aerial infrared imagery, which can detect vigor gradients in vineyards — useful to improve management, predict yield, and determine fruit quality zones. The full benefits of this technology are yet to be widely applied and appreciated. A likely further development will be "on-the go" fruit composition assessments, to allow differential harvesting or on-board fruit sorting.

Another marked change has been the reduction in cultivation, both under the vine and in the vine row. Many present-day vineyards would be regarded as "weedy" by viticulturists of the past, especially with the use of tractor row cover crops. However, in my opinion these are often not managed well, and can cause vine stress due to moisture and nutrient deficiencies.

Some changes not necessarily for the better

The last several decades have seen increasing commercial interest in fewer and fewer grape varieties. I feel uncomfortable that such tendencies are not always in the wine producer's or consumer's best interest. When there are literally thousands of varieties capable of making good wine, why restrict our tasting experiences to so few?

Some producers are realizing the benefits to be had by exploring other varieties, and they are the pioneers in what hopefully will become a major movement. English spelling and pronunciation of some variety names is an issue, which surely could be addressed by developing international registration of acceptable anglicized synonyms.

I also raise the issue of lack of interest in disease-resistant varieties, many of which are newly bred. We live in an age of

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great environmental awareness, for many people verging on "chemophobia." This is leading to increased awareness of the use of chemical sprays in vineyards, which in turn is finding expression in alternate forms of viticulture, such as "organic," "biodynamic," and "sustainable," the first two generally receiving more than favorable mention in the wine press.

There is an inherent assumption that "organic" and "biodynamic" are better for the environment, but to what extent are they? I have sympathy with some parts of organic production, especially the commendable emphasis on soil carbon. However I see the acceptance of some chemicals and not others as arbitrary.

Biodynamic supporters can speak for that system; I cannot, and see no benefit apart from marketing. On the other hand, many countries and regions have encouraged "sustainable" production, which has environmental, economic, and social motivation.

We need more studies about how vineyards actually degrade the environment. Some I am aware of emphasize soil compaction, yet this environmental issue receives little recognition, and how many growers are concerned with machinery weight?

In a similar fashion, covered or "tunnel" vineyard sprayers are most efficient at preventing chemical drift. Why is their use not encouraged more? Interestingly, I have seen more tunnel sprayers in England than I have in Australia or California, so there is room for improved adoption.

Another area requiring change is the strong influence of mythology in the wine sector. Despite technical training, and often with contrary research findings, myths can dominate the sector's thinking. One such example has to do with issues of yield and quality, and the recent "hang time" fad is another.

Finally, one very important area where little progress has been made is in quality description of winegrapes. Grapes are bought and sold with a minimum of quality specification, and so their value is somewhat arbitrarily defined. We know that different blocks in a vineyard can produce differing wine quality – even different parts within one block. We have failed over the last several decades to better specify winegrape suitability for quality winemaking, and this remains a challenge.

Conclusion

This is one person's view of changes in vineyards over the last several decades, and there could be some important changes missed. Readers' comments will be welcome. ■

Dr. Richard Smart is rewriting and thoroughly revising Sunlight into Wine. He is happy to receive statements from growers and winemakers about their commercial success with various aspects of canopy management. Interested persons should contact Dr. Smart by email at richard@smartvit.com.au. Dr. Smart visits the U.S. frequently, and consulting appointments can be made by email. See also www.smartvit.com.au

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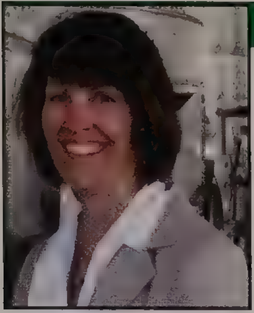

COMPLIANCE TRAINING -by Ann Reynolds, Wine Compliance Alliance

Website Resource Guide for Winery Compliance

Winery personnel responsible for compliance tasks often are at a loss when it comes to feeling confident in doing their job. The scenario is this: they either took a winery job which involves some compliance with little to no background in it or they were asked to take on compliance responsibilities after already being on staff at a winery.

Compliance is a complicated area to become thoroughly familiar with even under the best circumstances. It requires being familiar with the regulations of a minimum of five to six government agencies across the federal, state, and local levels. These regulations guide how wineries are to maintain their daily records, complete their reports, and file and pay their taxes.

Most of the staff at wineries that have some sort of compliance tasks on their job description do not show up at the winery already fluent in government regulation speak. Yet they are given responsibilities requiring them to have a certain level of fluency. In many cases they are not familiar with where they can find guidance to help them understand those compliance-related responsibilities.

This is why I introduce my winery clients to the range of resources in the form of websites and the helpful information that can be found there for keeping on top of their compliance systems. These websites are available across the spectrum of government levels, from federal to local.

Starting at the top level, all wineries are regulated by the federal Alcohol & Tobacco Tax & Trade Bureau (TTB). Their website is: www.ttb.gov/wine. This is probably the most practical website I recommend. It has continued to improve over the years by adding resources in the form of tutorials and other online training materials. Here is just some of the information that can be found by topic:

- Information on getting started in the wine business and what forms to file
- Guides for how to complete the monthly report 5120.17
- Wine label requirements
- Guide for how to complete the excise tax form 5000.24
- Common problem areas in audits
- Wine Online Seminar

The TTB offers other sites, including platforms for filing and managing your compliance records electronically. Their three current sites available for this are: COLAs Online, Pay.gov, and Permits Online.

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COLAs Online is the oldest of the three systems. It was first launched in 2002. This site is the electronic version used for filing label approvals. (COLA stands for Certificate of Label Approval).

The Pay.gov site is used across a wide spectrum of federally regulated industries, but for the wine industry there are two common reports that can be filed using it – the monthly report of wine operations (still referred to as the "702") and the Excise Tax report.

The Permits Online system is the youngest of the three systems. It was first launched in early 2011. This platform is currently available to those just getting into the wine business and is used to file the application materials for the basic permit and any amendments to it after the permit has been issued. This system is currently not available for use by already existing basic permit holders (current wineries already established pre-2011) but the TTB does plan to open it up to them as soon as later this year.

At the state level (in California) the primary regulating agency is the Alcoholic Beverage Control Board (ABC). Their website is: www.abc.ca.gov. While their site is not as user-friendly as the TTB site, it does offer some resources.

The license query search is helpful to look up the status of any of your ABC licenses. You can locate and find out when they renew and review all owner/officer information that is on record for each of them in the event that those items have changed and need to be updated.

On their site you can also look up lists of their license types and what their fees are, plus keep up to date on their industry advisories link for what updates to their regulations may impact you.

Another state level agency that most California wineries are connected to is the California Department of Food and Agriculture (CDFA). This is the agency that issues weighmaster licenses, processor licenses, and collects the data filed each year to compile the California grape crush report.

Their website is: www.cdfa.ca.gov. On their site are resources in the form of guides for those new to the world of being a deputy weighmaster, which provide good information on the dos and don'ts of weighing and filling out a certified weigh tag. This website is also where information on obtaining or renewing your annual weighmaster license can be found.

A local government agency also regulates these activities. The county agricultural commissioner's office has the authority to verify the accuracy of your scale(s), and audit your weigh records. You can locate their website(s) by doing a search for your county's name along with "agricultural commissioner."

A non-government agency with an information-packed website is the largest lobby group for the wine industry: The Wine Institute. Their website is: www.wineinstitute.org. Some of the helpful topics available for lookup here are direct to consumer shipping information, current wine industry statistics, and a full listing of all American viticulture areas (AVAs) that breaks them down by size, county, state, and date of inception.

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Many also offer online filing systems for the required reports, brand registrations, and license renewals — all of which speed up these processes across the board and provide an electronic documentation of completion for your and their records. Some states offering online lookup of current license details or brand registrations are California, Illinois, Michigan, Missouri, Texas, and Virginia.

States offering online filing and/or brand registration or license renewals are Florida, Illinois, Michigan, Missouri, Virginia, and Washington. The website addresses for each of these individual state agencies are all located on the Wine Institute's website, on their state shipping laws page.

Keeping on top of compliance records is a challenging task for most wineries. When I point out these various website resources to them, most were unaware they were there and are grateful to have found them. Knowing where to look for the answers to your compliance questions is a hugely empowering skill for anyone with those responsibilities at a winery. These websites are there just for that purpose. ■

Ann Reynolds is a wine compliance educator, author, and speaker with over 20 years of experience in the wine industry. Ann offers classes in many areas of wine compliance at Napa Valley College, Sonoma State University, and UC Davis Extension. Her business provides wineries with on site trainings, and system development. She can be contacted at: ann@winecompliancealliance.com

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Engaging and Managing Agencies – It Takes Two

BY Rebecca Hopkins
Folio Wine Company, Napa, CA

There are fewer investments more scrutinized in public relations (or indeed business) than engaging and managing public relations (PR) agencies. But no matter budget size, resource, work scope, or duration of program, gaining agreement to engage an agency is the easy part – the real work comes in finding and engaging a partner to take your brand message to the world.

Before engaging a PR agency, consider a few strategic questions:

What is the objective of investing in PR vs. another marketing approach? Raising brand awareness through the generation of publicity is not always the instant answer to a brand's marketing challenge. If brand positioning cannot be articulated, PR is probably not the answer, as clarity and congruency of messaging must be clear before it can be communicated.

What resources is the business willing to invest and what does success look like? Successful PR is grounded in building and maintaining strong and lasting relationships, based on an understanding of mutual business needs and objectives.

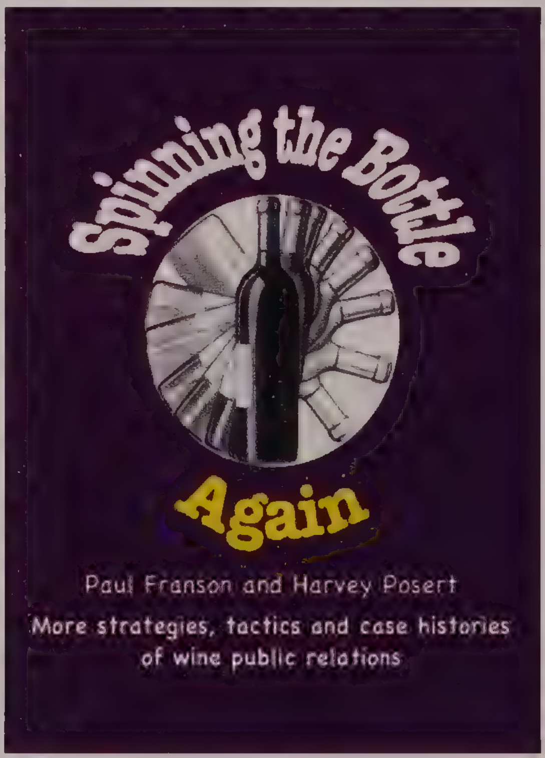
None of this occurs instantly and may not be immediately measurable so be clear on what the business expects and manage this accordingly.

Once the above questions have been addressed, consider these tips when recruiting an agency:

Bigger is not always better. There is little point buying a Rolls Royce when you can only afford to drive a Mini; i.e., better to be a large brand in a smaller agency as it is all about attention and service.

Unfortunately the additional resources that exist in larger agencies may appeal, but the level of seniority, service, and attention paid to your account is likely to be less in a large scale agency if you are a relatively small account.

One style does not fit all. Different brands need different types of programs and varying agency types. Specialization in the wine industry is common, and a successful agency is one that specializes and executes above industry standard in the chosen area of specialization. A focused trade relations objective requires an agency with demonstrated experience in this area, which may not necessarily be the biggest or newest agency in the industry.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Consider your budget and ensure your goals are realistic. Any budget scope given must include activation. Do not let the budget be consumed by a retainer unless you specifically negotiate a retainer-only contract where no additional costs are incurred.

While media relations should be part of the program, if there is no funding to execute against, there is nothing to take to your audience! In PR, there will always be unexpected opportunities, so ensure budgets are not overcommitted upfront.

Successful PR is as much about strategic plans as it is about capitalizing on opportunities as they present themselves.

Look for demonstrated experience in the field or at least a solid understanding of industry dynamics. Beverage alcohol has many restrictions and legalities that cannot be negotiated – great ideas must also be realistically executable (and legal!).

Enquire how ideas are presented. Many great ideas remain just that, as people do not realistically know how to bring the idea to life. Hoping the client buys the idea and figuring out later how to do it simply does not work.

Find a partner with a complementary working style. Account management synergy is important so observe the dynamics in the agency team. Look for respect across the team members.

A good indicator of agency culture is watching how the senior members of teams engage with junior members. Is the potential account team actively engaged in presentations and discussion? Much like any relationship, it is times of stress and disagreement that will test the relationship.

Spend the time writing a solid brief or RFP. A presentation against an RFP (Request for Proposal) will contain only top-line ideas against the potential of the programming that is available. However an RFP does not replace a solid scope of work, i.e., the working document upon which actual plans will be presented. This is where the final creative direction and actionable plans will be finalized.

Ask for specific examples of contacts within publications or outlets. Any agency can present a slide with mastheads or publication names, but what sets a great agency apart is the ability to give real life example of programs, named contacts or activities that demonstrate the ability to build ideas and relationships. Know they know the network.

As a Client

Provide the agency with ample information to understand your business and make strategic rec-

ommendations. Marketing positioning statements and core messaging are mandatory, but sharing sales and category performance history, key competitor analysis and long-term sales plans where appropriate help provide context.

Ensure strategy and programs can be interpreted to broader internal stakeholder groups. Great coverage is just that; however, long-term success relies on remaining a strategic and valuable contributor to the long-term success of the business.

Check that what is presented is logical and can be interpreted into language other areas of the business will understand (sales, operations, senior executives, etc.).

Gain alignment with internal stakeholders early on strategy and broad objectives. Ensure everything is based in brand language and measurable goals are set up front. Everything activated through PR must be grounded in brand strategy. Not only does it ensure a more integrated and executable plan, it also helps to prove the value of PR in the broader context of the marketing mix.

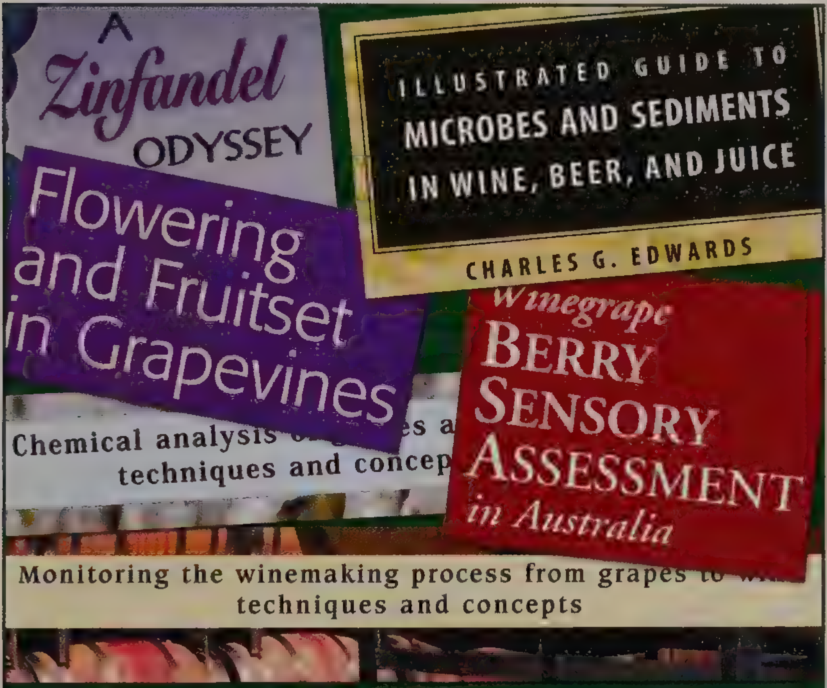
Review presented ideas for relevance and resonance. Put on your editorial hat. Do the agency ideas make sense, are they topical and newsworthy? Just because you think it is relevant does not mean it will resonate with the audience – why should they care?

Do not run at the first sign of trouble! Divergences in plans or scope are common in all agency engagement, so resist the urge to look to a new partner to fix the issue. Timely and candid conversations with existing partners can bring quick resolution and can help avoid the urge to run. Recruiting and on-boarding a new agency can take a substantially greater amount of time than addressing and resolving misunderstandings with an existing partner.

Make time to check in on the relationship. While weekly or frequent meetings are necessary to keep projects on track, be sure the broader relationship is healthy – agencies will work harder for you if the dialogue is two-way and they feel their input and work is valued. They may also be seeing developments or trends in the industry that may benefit your business.

Be transparent as plans change. Impacts from bigger business decisions (whether budget, direction, or resource-related) are easier to navigate when delivered in a timely and transparent manner. No one likes to execute less than agreed to, so timely transparency can be vital tool in helping to rework plans and maintain strong relationships. Successful agencies understand the changing dynamics of business, so engage them in working through necessary revisions to meet objectives.

Give recognition when and where it is due. Paying for a "service" does not equal the right to assume success. Recognition may be as simple as a timely phone call, thank you email, or token of thanks, particularly to the account team working on the business daily. Agencies work harder when they feel their work is appreciated. Don't we all!?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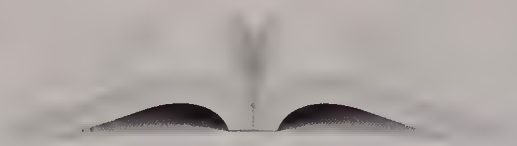

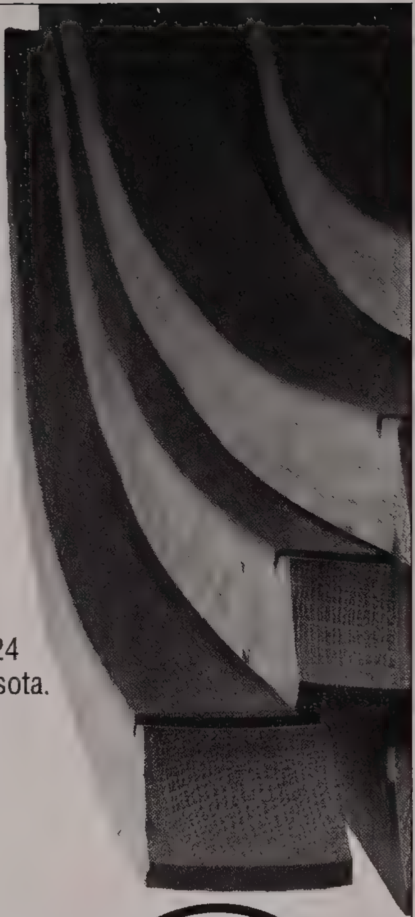

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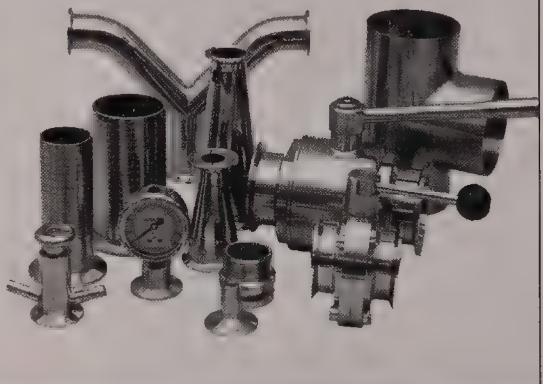

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Ending it all

Even in the world of the most successful relationship, change is inevitable. Whether it is a divergence of working styles, areas of specialty, or simply outgrowing one another, when a fresh approach is needed, a few simple tips can help the transition:

End the relationship as graciously as you started. The way you end an agency relationship says just as much about your management style and company as about the project at hand. Members of either team may end up as future suppliers, partners or employees, and if you are regarded as a fair and equitable partner in the final stages, future business opportunities will more likely be positive. You may also end up on the agency side at some point, so remain engaged, respectful, and cooperative.

Ensure handover is sufficient but not extraneous for all. Time equals money, so respect the agency's time, ensure necessary projects are handed over to the incumbent, and remain fully engaged until the process is complete.

Irreconcilable differences aside, offer to be a reference. If you were satisfied overall with the relationship and quality of work produced, agree to be included in a "Past Client" roster – every business has different needs and they may well be the perfect fit for another brand.

Summary

Engaging and managing agencies is a challenging, time-intensive and yet rewarding part of the PR process. Utilizing skills of negotiation, communication, sound business management, and issue resolution are key to ensuring a long and productive working relationship, and, above all, shared success for all involved. ■

Rebecca Hopkins is director of public relations for Folio Fine Wine Partners. She has been Vice President PR and National Events for Constellation Brands, responsible for leading the world's largest premium wine company's consumer brand communication strategies and event marketing programs for the U.S. market.

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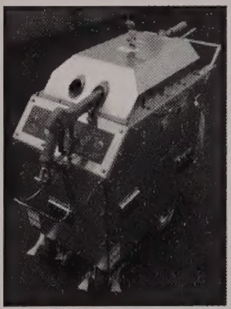

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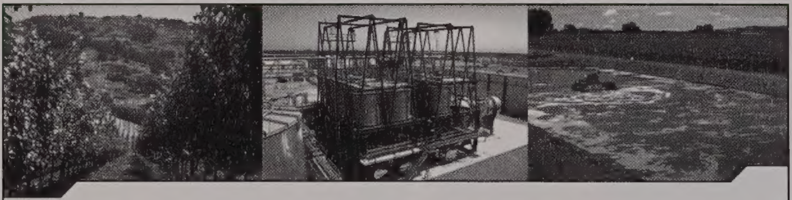

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